JULY 19, 1951

IRON AGE

VOL. 168 NO. 3

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DIGEST

of the week in metalworking

PAGE 15 **CMP THREATENS TO BOG DOWN FROM EXCESS**

The controlled materials plan is in serious trouble. More priority tickets have been issued than there are seats for the production performance. This is true of September, as well as the fourth quarter. Resulting confusion spurs sentiment to drop CMP and revive strict military DO rating.

PAGE 33 **BALANCE VITAL IN MACHINE TOOL CAPACITY**

One of the bigger bottlenecks in building more machine tools is production capacity on large tools. Builders know that finding capacity to build more tools won't help much if vital parts are still missing. Even at the present rate of operations some unfinished machines still lack vital parts.

PAGE 88 **AUTO INDUSTRY GRIPPED BY UNCERTAINTY**

One of the most confused moments in the postwar period, producers are confronted with many problems involving materials, markets, and labor. The uncertainty about steel poses a serious problem for both large and small producers. Further layoff trend is expected to increase during July.

PAGE 92 **DEVELOP NEW SPRING STEEL FOR TRUCK USE**

A Los Angeles firm has produced what is believed to be the first new alloy developed on the West Coast for two competitive western steel producers. U. S. Coast Guard last week halted unloading of a scrap shipment from the Orient because of the potentially explosive nature of this material.

PAGE 95 **INDUSTRY STEEL STOCKS TO GET CLEAN BILL**

Manly Fleischmann is ready to answer Congress' questions on steel distribution. Dope has it industry will get clean bill of health. But military may have unused stocks. Decision on closed-end CMP expected within next 10 days and results of Korean peace talks may swing the 50-50 balance.

PAGE 97 **STITCHING, A GROWING FASTENING METHOD**

Cheaper, faster metal stitching is replacing riveting and other joining methods in a wide variety of products. In some cases production has been upped as much as 700 pct at a cost of 9 to 12¢ per 1000 stitches. Shear and tensile strength is good. Relatively unskilled labor is used.

PAGE 102 **USE OF NEW BORON GRADES IS INCREASING**

New boron carburizing grades 94B20, 94B17, and 80B20 are being used in increasing tonnages. In fatigue and wear tests they are better than the alloys they replace. Boron steels distort more in heat treatment, but distortion is consistent and can be countered. Part III of a series.

PAGE 107 **TORQUE CONTROL REDUCES TOOL BREAKAGE**

Finding tool breakage on a deep hole drilling job was excessive, Kaiser-Frazer engineers designed a simple, inexpensive electronic torque control unit. They built it themselves from only $20 worth of components. The device reduced drill breakage on this job from 15 per day to zero.

PAGE 120 **SCRAP INDUSTRY EXPANDS AT RECORD PACE**

The scrap industry is already committed to spend about $8 million for expansion—may rise to $15 million. An assist goes to rapid amortization which provides incentive to expand. Most yards get certificates of necessity for 75 pct of their projects. Yard mechanization is much faster.

PAGE 122 **WAREHOUSE STEEL INVENTORIES EVAPORATE**

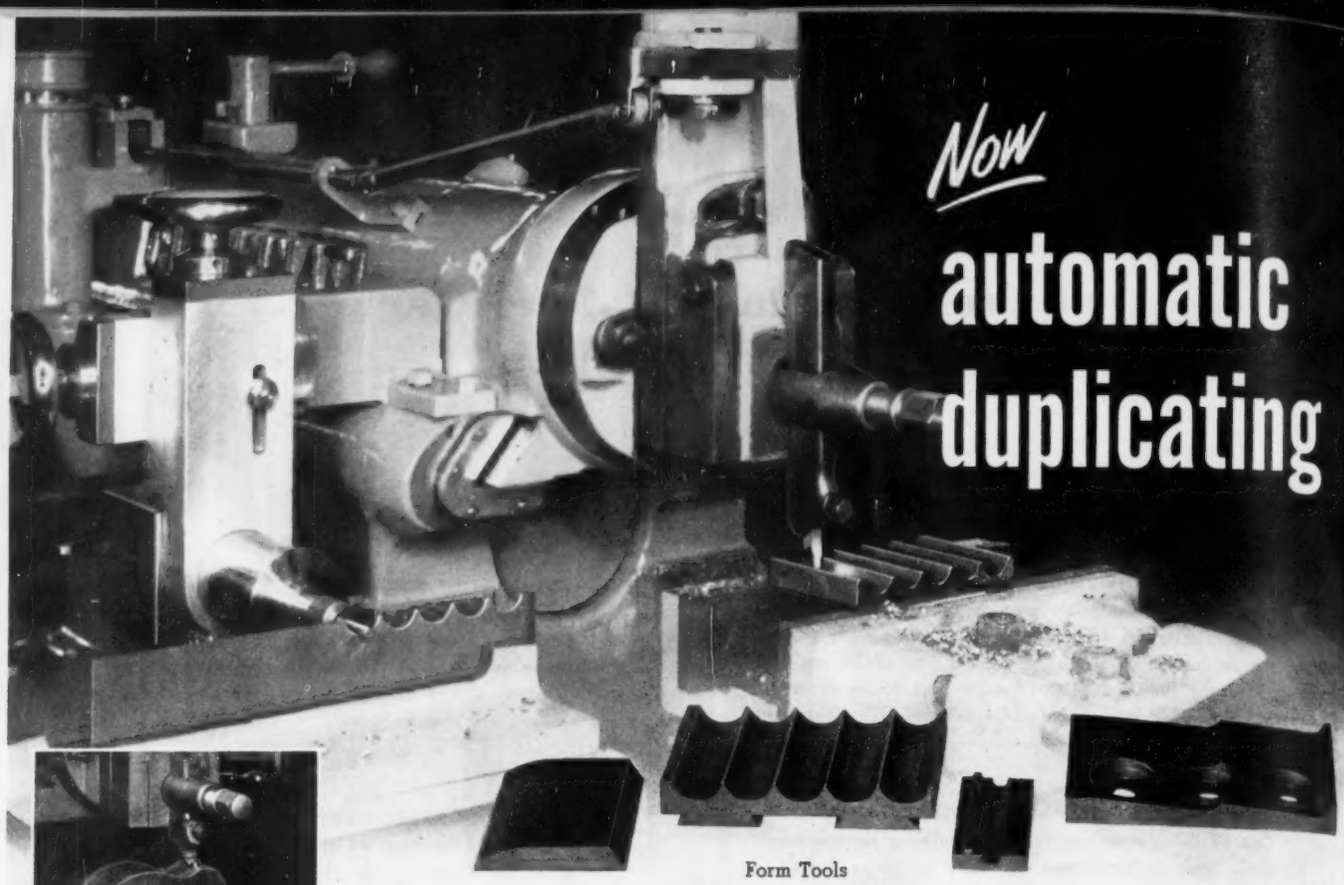
Steel warehouses are in a quandary. Their inventories have shrunk to 20 to 30 pct of what they were at end of 1949. And they're still sinking. But the tightest squeeze is on stainless and alloy steel items. Warehouse men are still waiting hopefully for help such as M-6 gives on carbon steel items.

PAGE 123 **STRUCTURAL STEEL USERS FACE BIG CUTS**

There won't be nearly enough structural steel to meet requirements during the fourth quarter. Needs already filed with DPA are double expected output. Even some defense users will have to be cutback. But preference will be given to industrial expansion and to military construction, NPA says.

NEXT WEEK **FIRST DETAILS OF METHOD X REVEALED**

Lifting of secrecy permits first publication of details of Method X, an electro-mechanical method for shaping carbides and hard alloys. Any standard metal cutting process can be duplicated. Action depends on mechanical, not thermal, action of electricity on the material being shaped.



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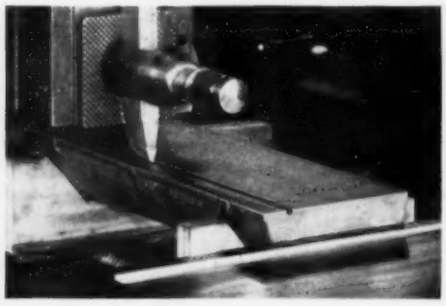

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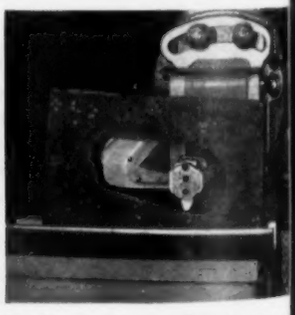

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Controls Are Like Narcotics

CONTROLS are like narcotics. The more you take them the more you depend on them. A fellow has a little pressure and the first thing you know he is taking something. That something must be advised and prescribed by the doctor. But when he takes it, it is a habit-forming drug. Nobody knows how many people started that way.

There is very little difference in the national picture today. We have controls by law. Some people want them because they know they have to be controlled. They can't depend on their own self discipline. Nor do they trust the other fellow.

Then there are those—and the number is growing—who are suspicious of controls. And for good reason. The longer we have them the better the chance that they may become a permanent fixture—no matter what Washington people say and no matter what industrial people in government service hope.

The steel industry by September will be practically under the control of the U. S. Government through the National Production Authority. Many of the top notch people in steel are advisors to the government in these controls. We say advisors because that is about all they are. They have no real authority. The authority lies with government people who can and often do overrule what industry leaders recommend.

There will be a tough time for steel customers in the immediate future. Their allotments will come from the NPA through the Controlled Materials Plan. Each group will fight for what it thinks it needs. It points to the freight car program, the ship program and the locomotive program as evidence that it should have special attention too.

We need the defense program regardless of Korea. We need it quickly; nothing should stand in its way. But we need something just as important as defense. We need freedom. We need to keep from ever having in this country the very things against which we are preparing to defend ourselves.

We must get rid of controls just as soon as circumstances permit. As to steel—when the freight car program needs no special help; when the cargo and ore boats are being built and when the locomotive program is on its way there is no reason under the sun why those programs should not be thrown back on their own.

If these programs are thrown on their own then all the other special programs—everything can be proven to be defense supporting if you really want to do it—can also go on their own.

Special attention should go to strictly military needs. There is no reason to believe that any steelmaker or manufacturer would dare to let down on military output. Nor should he be accused of such a thing before hand.

Let's get rid of controls as soon as we can so we won't have the makings of a controlled state—a state which we are fundamentally against.

Tom Campbell

Editor

Sure Stainless Pipe

IRON AGE *newsfront*

news methods and product forecast

► Materials controls are approaching a breaking point so fast that some well informed observers feel the time has come to begin removing them--item by item--just as quickly as practical. There is no question about retaining them on strictly military items but there is reason to believe other products may well be decontrolled sooner than had generally been expected.

► Several new methods of making titanium metal have recently been developed in laboratories but it may be a year or more before they can be tested in actual production.

► If security didn't require that it be kept under wraps, disclosure of the needs of the jet engine program would jar the complacency out of a lot of people. Demands for machine tools and forging equipment alone--not to mention critical alloy requirements --suggest that at present rates the program will be far behind schedule at the end of the year.

► Kaman Aircraft Corp. will test use of a gas turbine in a helicopter. They will use the engine developed by Boeing which has been used as a truck power plant.

► Some steel plant expansion programs are falling behind schedule due to inability to get steel--particularly structurals. Delivery of some types of mill equipment is also dropping way behind.

Fourth quarter structural steel requirements for all industry filed in Washington already add up to twice expected production. Even some defense users will be trimmed during that quarter.

► The Air Force has ordered a new fog dispersal system which will use gas-fired radiant tubes. The tubes, which give off the heat needed to disperse fog, will also serve as runway boundary indicators.

► Coal operators privately agree that they have a very tough fight ahead to hold their market for domestic heating and railroad power but demand for coal for industry keeps climbing steadily every year. There are no longer any big soft coal stocks on hand. John L. Lewis knows these facts very well and they may have their effect on next year's coal contract negotiations.

► Some market experts believe that magnesium output will jump from last year's 50 million lb to the neighborhood of $1\frac{1}{4}$ billion lb within the next 20 years. They are figuring on lower costs through better production methods. Also, byproducts of magnesium production may become more valuable.

► For emergency use, the Air Force is testing three lightweight (as low as $11\frac{1}{2}$-oz) .38 cal. revolvers. They have a 2-in. steel barrel with frames and cylinders of aluminum alloy.

► Despite the fact that new byproduct coke ovens are being rushed as fast as possible there is still such a shortage of metallurgical coke that more than 6000 beehive coke ovens are still working in the Connellsville, Pa., district. After the war their immediate death was widely expected, but one steel company alone operates 4000 today.

► Even some preferred CMP customers will be shopping for steel this Fall because it now appears that too many tickets were handed out for the September production performance.

Christendom was saved by steel

ALL day long, waves of Arab horsemen beat upon the ranks of Charles Martel's veteran militia. But time after time, the enemy cavalry recoiled before storms of iron-tipped javelins, their shining scimitars unsuccessful. On the second morning, the Saracen leader, Abderrahman, was slain, pierced with many spears. The Moslem horde fled back across the Pyrenees, never again to menace the Western world.

Time after time, as at Tours in 732 A.D., Christian civilization has been threatened by seemingly invincible enemies. Yet history proves that victory invariably has gone to the nation or alliance which excelled in the production and use of iron and steel.

In the present era of alarms and crises, it is reassuring to realize that America has greater capacity for making steel than all the rest of the world combined. Furthermore, the American steel industry is expanding at a rate far faster than that of all the dictator-directed economies behind the Iron Curtain. Our free and independent steel making and metal working industries can and will forge sinews for the peace we want or for the war we may be forced to fight.

So remember this: It is not only the threat of Muscovy to fear—America has itself to fear also—its misguided sentimentalists, its sheltered saboteurs—who seem to play communism's game by frittering away our strength and our resources.

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IRON AGE *summary*

iron and steel industry trends

CMP in serious trouble . . . Too many tickets issued for production . . . Historic customer relationships disrupted . . . Urge decontrol.

Trouble Ahead — The controlled materials plan is heading into serious trouble. More tickets have been issued for the production performance than there are seats in the house. This applies to steel allocations for both September and fourth quarter delivery. Some steel companies are returning allocations for both periods; they are already booked to the limit of the tonnages they must accept under the plan.

Although rough sailing had been predicted for the good ship CMP, it's shakedown cruise is proving even stormier than had been expected. During the past 10 days steel producers have been engulfed in a flood-tide of CMP orders. The control dykes are already cracked; if they break completely CMP will be left on the rocks.

Warnings Ignored — CMP orders are being returned to consumers by the hundreds, as their total mounts beyond the required acceptance percentages. Instead of assuring steel needs to an essential user, a CMP order, in some cases, is nothing more than a hunting license.

This comes as no surprise to steel people. They have repeatedly warned that if the Government is to make large-scale allocations of steel they must be matched against actual production. Past experience has shown CMP to be far superior to other methods of priority distribution because this basic rule was followed. When it is violated CMP loses all advantage, becoming no better than other plans that failed miserably.

Who Is To Blame?—Disgruntled steel consumers who have had their CMP orders returned are making the rounds of other producers with the same discouraging results. They can hardly be blamed for becoming angry over being allocated steel which will not be available.

Actually some consumers are almost as much to blame for this dilemma as are people in charge of the program. They overstated their needs so much that even cuts in original requested tonnages made by NPA left some of them with certified checks for more steel than they really need. Steel producers know this because they are familiar with historical requirements of their customers. NPA officials are finding out the hard way—by trial and error. Their's is the primary responsibility, and their's will be the blame.

Shuffle Board—Some long-standing customer relationships are being disrupted. CMP orders must be filled on the basis of first come. Hence some mills are forced to accept large orders from consumers whom they have seldom or never served in the past. At the same time some of their regular customers have arrived too late and have been forced to "go shopping" for their steel. Even if they are able to get on a remote mill's books they will have to pay additional freight charges.

Limit Controls?—Present confusion has revived talk within the steel industry on limiting controls. Sentiment is growing that perhaps a better plan would be to drop the entire CMP program and return to a straight DO system limited strictly to military needs. The mills feel that they could do a better job of distributing the remaining steel among defense supporting and other essential users than is being done—and still have some free tonnage for non-essential consumers. At present so-called "free" tonnage is infinitesimal; CMP is practically closed-end without being so labeled.

Steelmaking operations this week are scheduled at 102 pct of rated capacity, up half a point from the previous week.

(Nonferrous summary, p. 168)

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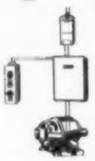

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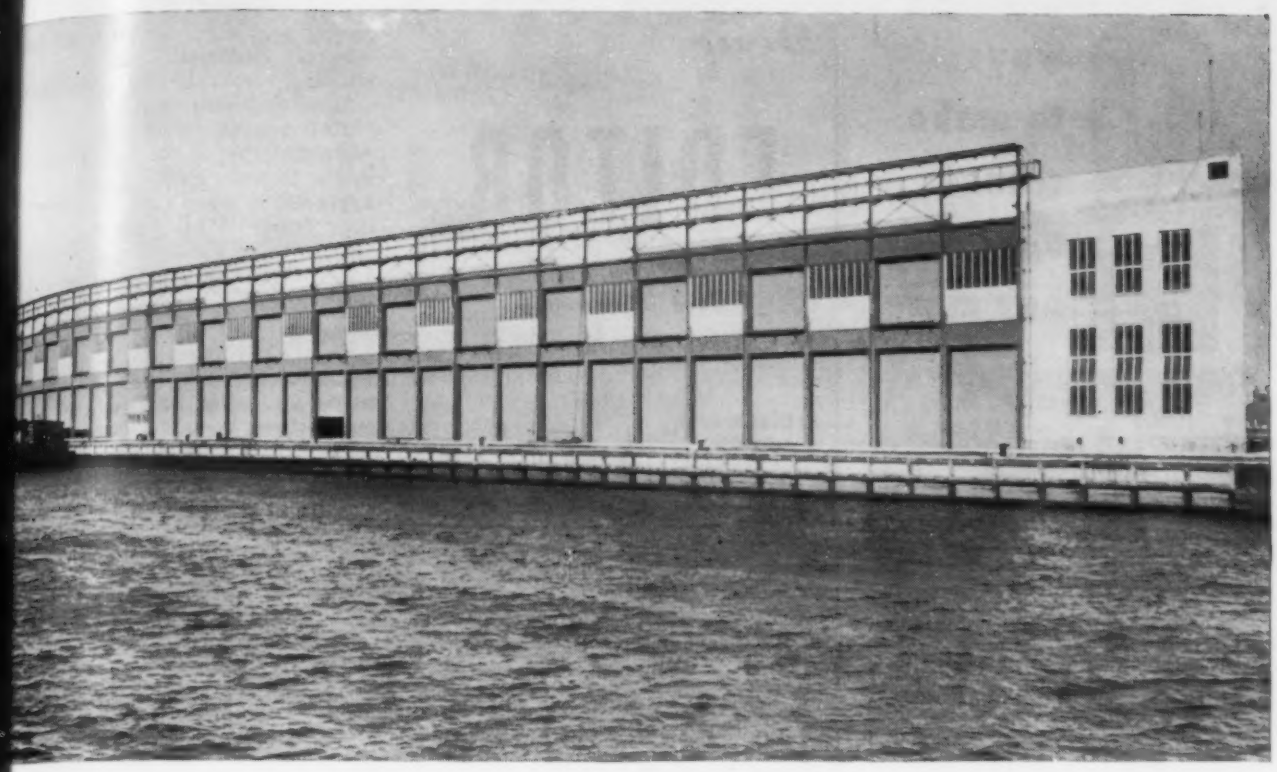

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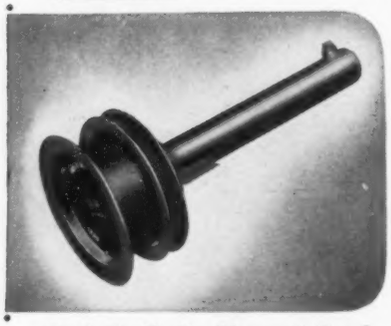

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steadies your clamshell buckets. Provides ample coil spring power at all boom angles to keep bucket lined up with the work. Makes more loads per day easier. Rud-O-Matics are foolproof, trouble-free. Eight sizes meet all requirements. Available immediately. *For full information see your dealer—or mail coupon below.*

I'd like more information on ☐ Rud-O-Matic Taglines, ☐ Rud-O-Matic Magnet Reel-Tagline Combinations. Send literature and complete details.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

McCAFFREY-RUDDOCK Tagline CORPORATION

2131 East 25th Street • Los Angeles 58, California

Dear EDITOR

letters from readers

Praiseworthy

Sir:

Our editorial staff thought the May 24 editorial, "Courtesy—A Two-Way Street," was a direct and praiseworthy censure of the very evident bad manners of our "fast world." May we have permission to reprint this editorial in our house organ, "Pipe Dreams?"

M. PUCHIR
Editor, Pipe Dreams
Universal Concrete Pipe Co.
Columbus, Ohio

Scrap Needed!

Sir:

As chairman of the Scrap Mobilization Committee in this area I have read with interest the article, "Steel Scrap Supply Needs Violent Upward Push" by Ted Metaxas, in your June 28 issue.

I would like to request permission to reproduce this article in full and to enclose it as a stuffer in material sent to possible scrap outlets in this area.

R. HOFFMEYER
Division Manager
Ferro Stamping & Mfg. Co.
Mt. Pleasant, Mich.

Powdered Iron

Sir:

We expect, shortly, to have a production of 2 tons per day of powdered iron, 100 to 200 irregular mesh reducible to 300 mesh, 99.9 pct pure, and are endeavoring to locate possible purchasers. This material originates in this area from chemical wastes.

We will appreciate any information you can furnish.

C. B. EDINGTON
Southern Steel Co.
Los Angeles

We think your best market would be for shell rotating bands. The possibilities of that are outlined in the article "Cold War Puts Heat on Metal Powder" (THE IRON AGE, May 3, 1951, p. 95) which also gives the names of some companies who make parts of powdered iron.—Ed.

Seeks Sorter

Sir:

Automobile production always generates a large quantity of mixed small parts such as bolts, nuts, screws, washers, etc., dropped in assembly and swept up from the floor. Aircraft production, which we are starting, generates an even larger volume of mixed aluminum rivets.

Has anyone developed the processes described in the article "Instruments Unsnarl Metal Mixups," which appeared in your June 21 issue? Or does anyone think they can be developed to sort this type of material?

K. L. RIGOR
Manager, By-Products Disposal
Kaiser-Frazer Corp.
Willow Run, Mich.

We suggest you contact the DuMont Laboratories, Passaic, N. J. with reference to the Cyclograph instrument, now being manufactured by J. W. Dice Co., Englewood, N. J., designed especially for sorting small parts such as you mention.—Ed.

Arousing Interest

Sir:

We would greatly appreciate your mailing us four copies of the article "Boron Steels, Part I" in your July 5 issue.

C. C. FLETCHER
Purchasing Agent
Worcester Pressed Steel Co.
Worcester

Sir:

Your July 5 issue contains the article "Boron Steels, Part I" in which I am extremely interested. I would appreciate tear sheets of this article.

G. C. OLSON
Melting Superintendent
Atlas Steels Ltd.
Welland, Ont.

Carbide Drills

Sir:

We have received a request from one of our distributors to run portions of the article "Carbide Drills Increase Tool Life on Cast Iron," appearing in your May 31 issue, in his local publication.

We would appreciate your advising us if such a request meets with your approval.

T. D. HEAP
Carboloy Dept.
General Electric Co.
Detroit

Virginia Bessemer?

Sir:

We would appreciate your advising us which steel or iron furnaces employ methods permitting the use of iron ores carrying phosphorus in the 0.4 to 0.6 pct range.

A typical analysis of the iron ore to which we refer is as follows: iron 59.58 pct, silica 3.68 pct, alumina 1.55 pct, phosphorus 0.46 pct, and manganese 0.23 pct.

L. M. LEE
President
Virginia Manganese Corp.
Richmond, Va.

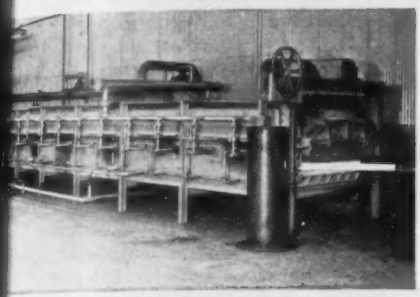
Your analysis indicates that it is a Bessemer iron ore. It could be used for openhearth iron production, but the phosphorous range is low enough to qualify for Bessemer and, therefore, should be utilized for that process.—Ed.

EMAND

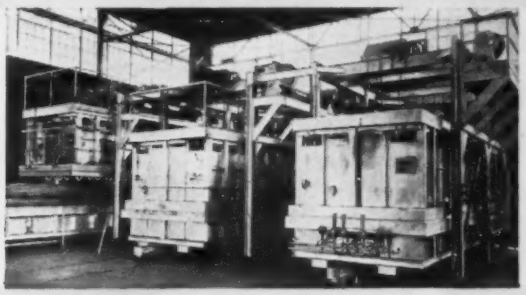
heat

FROM INGOT THROUGH FINISHED PRODUCT

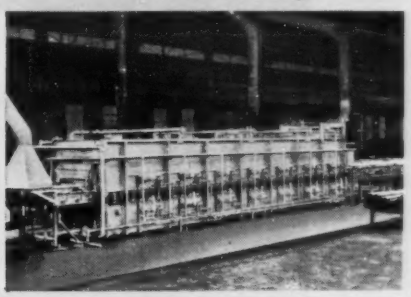
Wire patenting furnaces.



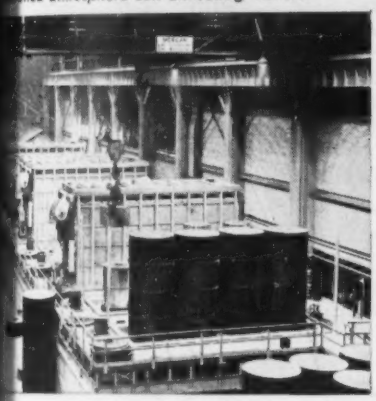
Batch type carbon correction annealing furnaces.



Continuous bright annealing and normalizin furnaces for tubing.

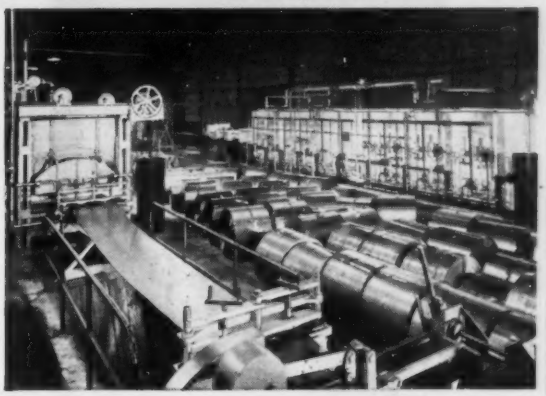


...oiled atmosphere coil annealing covers.

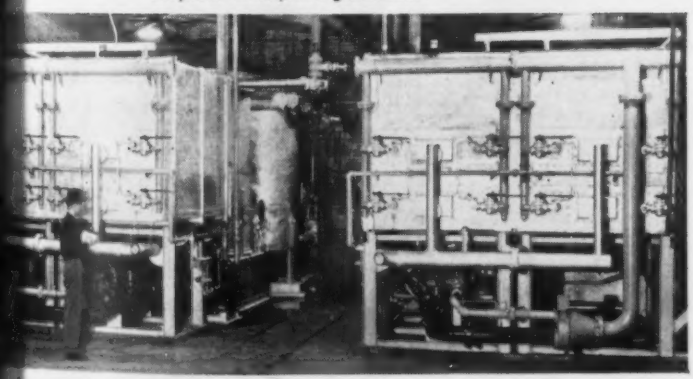


Pit type convection furnaces for rod annealing.

Continuous strip annealing and normalizing furnaces.

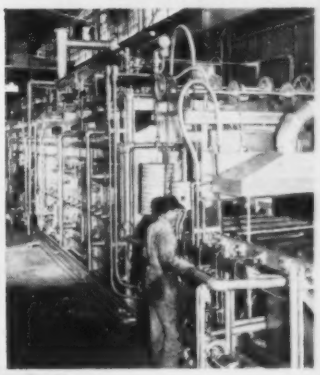


Prepared atmosphere generators.



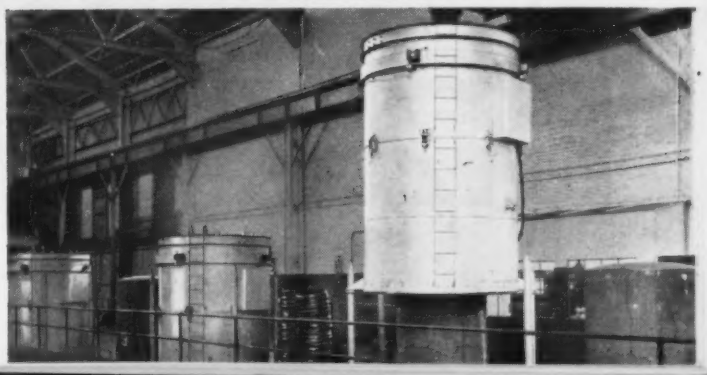
Stress relief furnaces.

Continuous controlled atmospher annealing furnaces.



Continuous armor plate heat treating furnaces.

Controlled atmosphere wire and rod annealing covers.



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Carbide spray nozzle orifices are finished to tolerances of .0005" at Spraying Systems Company, Bellwood, Illinois. New Elgin DYMO-C diamond abrasive used in place of diamond powder-oil mixture produces more pieces per hour and conserves diamond, too!

ELGIN DYMO-C*
diamond abrasives
*C FOR CARBIDE

Here is a complete new diamond abrasive specially prepared to speed carbide finishing operations. It cuts faster, won't work back on the lap, won't settle and comes ready to use without time-consuming mixing. Write for complete information—ask for a free demonstration.

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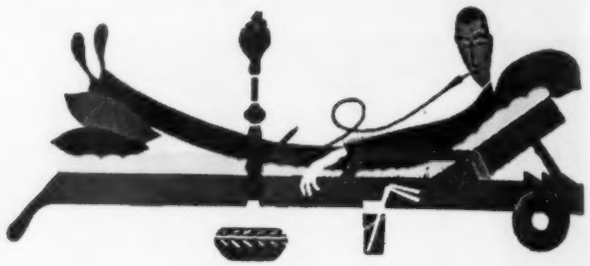
ELGIN NATIONAL WATCH CO.
ELGIN, ILLINOIS



Fatigue Cracks

by Charles T. Post

For the Birds

For months, the three pigeons met for lunch every day at Battery Park, way down at the lower tip of Manhattan. The food was good but monotonous.

"Just for a change," said Sam to Bill and Jim, "let's go up to the steps of the public library at 42nd and Fifth tomorrow. I hear the corn's good up there."

At the agreed hour the next day, Bill and Jim descended from the sky to the public library steps, but there was no sign of Sam. They waited and waited, and finally the two of them started their meal. Just as the dessert course was being scattered by a kindly bibliophile, Sam strolled up.

"Where the devil have you been, Sam?" cooed his friends. "We waited as long as we could."

"Dreadfully sorry," said Sam. "It was such a nice day that I walked."

Boron

Right from the start, boron steels, about which you have been reading in the weekly issues of your f.f.j. these days, are a hot subject. They will cushion the shortage of chromium, nickel, and molybdenum for most civilian, and many military uses, for one thing.

For another, the boron minerals are found in some of the hottest parts of California's Mojave (say Mo-ha-vee) desert—so hot, in fact, that many of the workers are glad to drive 200 miles a day going and coming from work rather than live nearby.

Yes, boron comes from borax, the same stuff the little woman uses in the laundry. We asked some of the girls in the office why they put borax in the wash. They said it made the clothes cleaner. They didn't know why. To get the low-down we called up the Twenty Mule Team Borax people, whose head office, incidentally, is on Park Ave., New York. The girl on the switchboard there assured us that borax was a water softener.

There's something almost prophetic about the development of boron steels. One of the first to be announced by U. S. Steel back in 1947 carried the trade name U·S·S SuperKore A. With a slight typographical slip, that would read "Super-Korea." As it turns out, boron steels are going to come in mighty handy if the time comes for a Super Korea.

Scrap Sleuth

If a man walks into your plant with a big orange celluloid button on his lapel inscribed "Scrap Sleuth," don't confuse him with a Junior G-Man. He's one of the more than 70 sales representatives of Solar Steel Corp., who will be spending their entire time for the next 60 days locating scrap in industrial plants.

Solar is going all-out on the national scrap drive, having a lot of fun out of it, and will probably make a lot of friends (as well as bring in scrap) in the bargain. The sales staff has been fully briefed and equipped, and the plants to be visited have been circularized before the Scrap Sleuths arrive with a check list for plant scrap salvage and an explanation of how the Sleuths operate. As an added backstop, Solar's advertising in your f.f.j. and other publications features the work of the Sherlocks.

The pay-off is that the three Scrap Sleuths who dig out the most tonnage get an expense-paid vacation trip as a prize.

Aptronym

Newest candidate for the name-fits-the-job society is Minnie Penman, the Santa Ana, Calif., school teacher who just retired. What else would she teach but penmanship?

Fatigue Cracks

Continued

Shockers

We are expecting a complaint on last week's issue of your f.f.j. from our Aunt Prim, who reads only the headlines. The top item in Bob Reinhardt's West Coast Progress Report was headed "Still To Be Built." That raised our thirst for corn likker, but it turned out that the news concerned a yet-to-be-built blast furnace of Henry Kaiser's, not a still at all. Then, back in the news section, was a heading, "No Signal for Laxity." Fine, we thought. We can be lax without waiting for the signal that the boss has gone home. False alarm. It turned out that Mike DiSalle had merely said again that price controls should not be dropped because of Korea.

Puzzlers

Our suggestion to take the Farmer Jones problem down to the farm during vacation was apparently adopted by quite a few. A. E. Thompson, The Midland Co., C. G. Heilman, Commonwealth Industries, Inc., W. E. McCord, Baltimore, M. Cooperman, U. S. Gas Range Corp., F. J. Binckes. Binckes Engineering Co., J. G. Huebner, Foster Bros. Mfg. Co., F. J. Prucha, American Smelting & Refining Co., R. W. Huff, Canton, Ohio, and L. F. Calzi, Philadelphia, rushed their replies right from the farm.

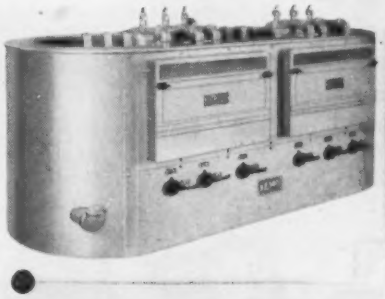
H. L. Ludwig, U. S. Steel Export Co., doesn't think our puzzlers are complicated enough so he concocted this one. A man and wife, celebrating their twentieth wedding anniversary, have a son and twin daughters. The age of the wife equals the combined ages of the children. When the couple first met, three years before their marriage, the man's age was half again as much as the woman's. In as many years from now as each twin is now old, the combined ages of the parents will be half again as much as the combined ages of the children then. Double the husband's present age plus the present age of the son is equal to double the wife's age plus three times the age of one twin. When the couple's silver wedding anniversary arrives the son's age will be half the age that his mother's will be then and equal to the combined present ages of the twins. If the family survives to the date of the golden anniversary, the son will be as old as his father is now and the combined ages of the children will be half again as much as the combined present ages of the parents. What are the present ages of each member of the family?

Actual reports show:

KEMP

Cuts Melting Costs

Above is a 44" pot with 10,000 lb. capacity. Casting rate: two tons per hour. Estimated fuel savings of up to 40%.



Many newspapers report actual fuel savings of from 50% to 60% on fuel with 10-ton capacity melting pot shown above.

Kemp Gas-Fired Immersion Melting Pots Save up to 40% on Fuel Alone

Here's why you should replace conventional melting equipment with modern, efficient Kemp Immersion Pots. Actual reports show proof that Kemp Immersion Heating cuts fuel bills up to 40% and more. Now you can melt soft metals, lead, pewter, tin, or salt with maximum thermal efficiency and get double the rate of heat recovery.

POSITIVE HEAT CONTROL

Kemp Immersion Melting Pots have no brickwork to steal heat, no external combustion chamber, no carbon monoxide, no temperature overrun. You get high melting rates, reduced dross formation, speed of temperature recovery after adding cold materials . . . *PLUS* an estimated fuel saving of up to 40%.

FOOLPROOF OPERATION

Each installation includes the Kemp Industrial Carburetor to assure complete combustion, lower installation cost. Tell us your heating or melting requirements. We can help you make your unit more profitable.

KEMP OF BALTIMORE *IMMERSION MELTING POTS*

Write for Bulletin for technical information.
Address: C. M. KEMP MFG. CO.
405 E. Oliver St., Baltimore 2, Md.

CARBURETORS • BURNERS • FIRE CHECKS • ATMOSPHERE & INERT GAS GENERATORS
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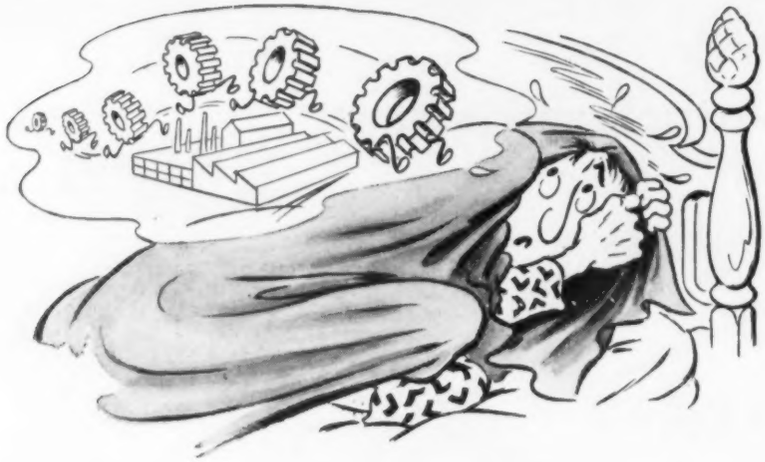
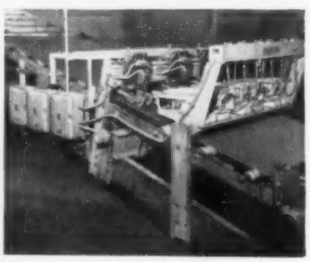


Why lose sleep counting scrap?

If you're worrying about profits (and how to produce them) you're also probably worrying about scrap (and how to eliminate it). Federal Gages *can* improve the control of dimensions throughout your manufacturing processes — the sure way to reduce scrap, waste, and rework . . . the sure way to increase profits.



Continuous Measuring Gage checks thickness of hard board sheets . . . automatically marks defective areas.

How do we know it's the sure way?

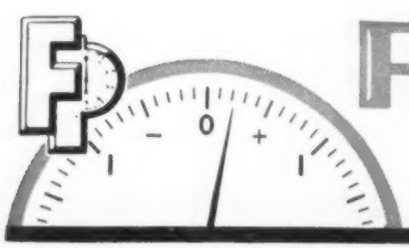
Because we've been building Gages for over 20 years. Because we've helped every type of manufacturing industry . . . and seen our Gages improve quality, reduce scrap, and increase output. Because we have over 20,000 individual gage designs in our engineering files — each representing an actual case where Federal Gages have been put to work PROFITABLY. Because we offer you the choice of the right gaging system (mechanical, air, electronic, electrical) correctly designed (on the basis of actual experience) to do your job in the best possible way (manually, semi-automatically, fully automatically).

Federal Dimensionair Air Gage (range .003", magnification 2500 to 1) used in combination with Dial Indicator.

Don't lose sleep over scrap. Put your dimensional control problems up to Federal. It's the wise thing to do. FEDERAL PRODUCTS CORPORATION, 1137 Eddy St., Providence 1, Rhode Island.

FEDERAL
DIMENSIONAL CONTROL IS ALWAYS IN THE PICTURE

Electronic Gage automatically sorts mica sheets into correct thickness categories.



FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES.

DATES *to remember*

Sept. 6-7—Rail Steel Bar Assn., semi-annual meeting, Broadmoor Hotel, Colorado Springs. Association headquarters are at 38 S. Dearborn St., Chicago.

Sept. 10-14—Instrument Society of America, national instrument conference and exhibit, Sam Houston Coliseum, Houston. Society headquarters are at 921 Ridge Ave., Pittsburgh.

Sept. 10-14—International Foundry Congress, Brussels. All correspondence should be addressed to the general secretary, Foundry Congress, c/o Fabrimetal, 17 Drapiers St., Brussels, Belgium.

Sept. 11-13—Society of Automotive Engineers, tractor meeting, Hotel Schroeder, Milwaukee. Society headquarters are at 29 W. 39th St., N. Y.

Sept. 21-23—National Assn. of Waste Material Dealers, Inc., annual fall meeting, Saranac Inn, Saranac Lake, N. Y. Association headquarters are at 271 Madison Ave., New York.

Sept. 24-26—National Truck Body Manufacturers & Distributors Assn., annual convention and supplier's exhibit, Haddon Hall, Atlantic City, N. J. Association headquarters are at 346 Connecticut Ave., N. W., Washington.

Sept. 25-26—Steel Founders Society of America, fall meeting, The Homestead Hot Springs, Va. Society headquarters are at 920 Midland Bldg., Cleveland.

Sept. 25-28—American Society of Mechanical Engineers, fall meeting, Hotel Radisson, Minneapolis. Society headquarters are at 29 W. 39th St., New York.

Sept. 26-28—National Metal Trades Assn., annual convention, Palmer House, Chicago. Association headquarters are at 122 S. Michigan Ave., Chicago.

Sept. 26-29—Marking Device Assn., national convention, Edgewater Beach Hotel, Chicago. Association headquarters are at 134 N. LaSalle St., Chicago.

Oct. 1-4—Assn. of Iron & Steel Engineers, annual convention, Sherman Hotel, Chicago. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Oct. 3-6—Pressed Metal Institute, annual meeting, Hotel Drake, Chicago. Institute headquarters are at 13210 Shaker Square, Cleveland.

Oct. 8-13—Concrete Reinforcing Steel Institute, semiannual meeting, Grove Park Inn, Asheville, N. C. Institute headquarters are at 38 S. Dearborn St., Chicago.

Oct. 10-12—Porcelain Enamel Institute, annual forum, Ohio State University, Columbus. Institute headquarters are at 1010 Vermont Ave., Washington.

Oct. 14-19—National Metal Congress & Exposition, Detroit. American Society for Metals headquarters are at 7301 Euclid Ave., Cleveland.

Oct. 15-18—American Gas Assn., annual convention, St. Louis. Association headquarters are at 420 Lexington Ave., New York.

machine tool high spots

sales inquiries and production

by George Elwers

OPS Misses Target—The new machine tool price order, GOR 15, states that it was issued pursuant to a directive from the Office of Defense Mobilization to modify machine tool price controls "to the extent necessary to give (builders) the incentive to expand their production." Industry leaders who got an advance look at the order feel it does no such thing. By controlling prices through a limitation on profits, they say, the order gives no incentive to increase unit production, to subcontract, nor to increase workers' hours.

No Incentive—The order limits profits to a percentage rate of return on assets used in manufacturing. Adding a second and third shift, extending the work week, and subcontracting will do little or nothing to increase a machine tool builder's assets, so he will neither gain nor lose from indulging in this extra activity. It is true that GOR 15 theoretically removes the possibility of loss due to the high cost of subcontracting, but at first glance machine tool builders fail to see how it will act to encourage this important means for expansion of output.

Subcontracting — There seems to be a joker in the order which favors going into production of complete machine tools, as subcontractors, by firms never before in the business. Having never built tools, they will have no assets used in machine tool production during the base period on which to compute a profit rate. The order specifies in this case that a rate of 21 pct shall be assumed. Eighty pct of 21 is 16.8 pct, a very nice profit margin indeed.

Vicious Circle—One rumored deal, which contrary to reports published elsewhere has not yet been consummated, has an auto company division taking over quantity production of one model in a New England machine tool builder's line. On the surface, this looks good, since workers are being laid off in the auto industry and presumably some machines are standing idle. But the hitch is these are not necessarily the right type of machines. One estimate is that the auto builder would have to acquire at least a half-million dollars worth of additional machine tools before it could go into production. This vicious circle — scarce machine tools are needed to build scarce machine tools—turns up everywhere.

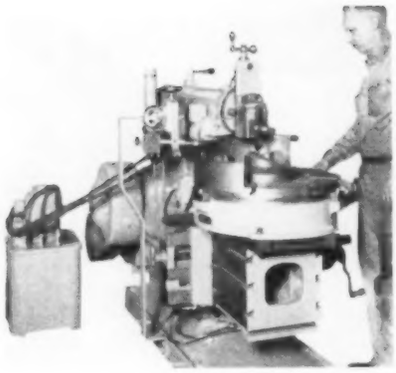
The Enigma—One of the big bottlenecks in building many machine tools is production capacity on large tools—planers, planer-type milling machines, and big boring mills. Tools like this aren't available in the plants of the sewing machine makers, roller skate makers, and the other civilian industries—including auto plants—which wishful thinkers expect can act as machine tool subcontractors. There's little point in finding capacity to build 90 pct of a machine tool if parts to finish the other 10 pct can't be had. Even now there are partly-completed machine tools standing on builders' assembly floors waiting for essential components.

Reserve Tools—Experience with machine tools from government reserves is not all bad. One auto firm with a tank contract has withdrawn and put into use more than 350 machines, and hasn't found the experience too harrowing. Some work had to be done on nearly every machine, mostly cleaning and minor repair.

How They Did It—Machines were picked from the automotive pool lists of the Bureau of Ordnance. Then teams went to warehouses to inspect the machines for condition and suitability for the job to be done. These teams did not find, on inspection, many machines which were unusable because of poor condition. Their main trouble was finding machines which were not suited for the operations to be performed, which the Washington records had not been complete enough to indicate. Cleaning and repair of the machines was done by employees of an outside contractor, in the auto maker's own shop. An average of 50 men were employed for this work.

NEW *equipment*

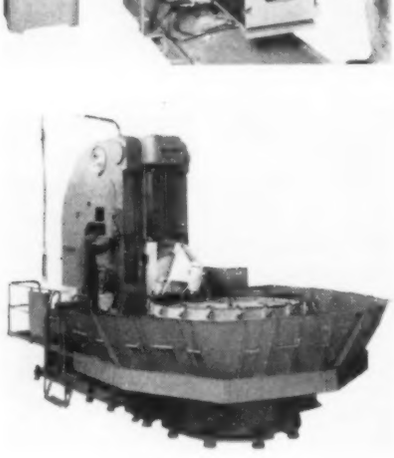
new and improved production ideas, equipment, services and methods described here offer production economies... fill in and mail postcard on the opposite page.



Hydraulic duplicators effect time and cost savings

The application of a hydraulic duplicator to a Cincinnati 24-in. shaper has resulted in a cost reduction in the production of brake mechanisms for overhead cranes. With the use of duplicator and rotary table, interchangeable mating sections were made in a single operation in a fraction of the time previously required. The follower equipment consists of a motor and pump, a stylus operated hydraulic valve, template, and a hydraulic cylinder attached to the elevating screw. Table feed is automatic and is horizontal or circular. The template operates the stylus and control valve, which causes the table to move up or down. Depth of cut is controlled by the tool slide feed screw. *Cincinnati Shaper Co.*

For more data insert No. 1 on postcard.



Gear shaver handles large spur and helical gears

Internal and external spur and helical gears with face widths up to 40 in. and pitch diameters to 100 in. can be shaved on the new Model GCT gear shaver. The machine is especially applicable to gears used in tanks, power shovels, large speed reducers. Shaving is accomplished by the rotary crossed axes principle with the work gear driving the cutter. The general design includes an independently driven rotary work table and a column which moving horizontally carries the cutter head to and feeds it into the work. The cutter head reciprocates in its vertical slide across the face of the work. *National Broach & Machine Co.*

For more data insert No. 2 on postcard.

Dry burnishing barrel designed for hard wear

A new deburring machine is sturdily built and compact, with large opening and removable hopper type door for quick loading and unloading assuring easy accessibility. The barrel has 7½ cu ft capacity with speed of 20 rpm. Power is supplied by a gearhead motor, 220 v, 60 cycles, 3 phase, 1/3 hp, with roller chain drive. A ¼-in. rubber lining vulcanized to drum is optional. A thermal overload switch provides protection. *Supreme Metal Products Co.*

For more data insert No. 3 on postcard.

Strap cutter operates with minimum effort

A lightweight tool designed to cut flat steel strapping up to ¾ in. x 0.035 in. with minimum effort features simple construction. A band guide prevents straps from wedging sidewise between the blades, and a flat lower blade permits easy insertion beneath tensioned straps on bales, bundles and cartons. Frame and blade are forged steel. Narrow span handles are curved to fit the grip of the operator. Measuring 9½ in. long, the tool weighs 1 lb. *Acme Steel Co.*

For more data insert No. 4 on postcard.

Turn to Page 36

FREE *publications*

These publications describe money-saving equipment and services... they are free with no obligation... just fill in and mail the postcard.

Gage blocks

A new 8-p. booklet describes a variety of precision gage blocks, including solid carbide gage blocks. Developed from a special grade of carbide, these blocks offer maximum resistance to wear and a high degree of stability. The blocks, precision lapped at 68°F to extreme accuracy, have excellent wringing qualities and resist rusting and corrosion. *Pratt & Whitney, Div. Niles-Bement-Pond Co.*

For free copy insert No. 30 on postcard.

Needle bearings

Application of needle bearings to pump design is the subject of the May-June issue of *The Bearing Engineer.* Proper procedures for handling, storing and mounting bearings are also described. *The Torrington Co.*

For free copy insert No. 31 on postcard.

Transformers

Electronic applications of Stancor transformers and related components are the subject of a new 18-p. booklet. Described as one of the most complete lines for television, radio and other electronic applications, the items are classified and indexed for ready reference. *Standard Transformer Corp.*

For free copy insert No. 32 on postcard.

Strain gage

Descriptions and specifications for a new SR-4 "Post Yield" resistant wire strain gage, suitable for strains up to 10 pct, are given in a new bulletin. *Baldwin-Lima-Hamilton Corp.*

For free copy insert No. 33 on postcard.

Production control

Efficient visual control of production, scheduling, engineering and inventory is discussed in a 4-p. bulletin entitled *"Look AT the Facts Instead of FOR Them."* The bulletin shows how such control boards may be used to visualize operating effectiveness at a glance at any hour of any day. *Visi-Trol Corp.*

For free copy insert No. 34 on postcard.

Perforated metals

The wide possibilities for application of perforated metals in industrial and architectural design are presented in a 28-p. brochure. Styles of pierced, slotted and indented materials, with accompanying engineering data, are included. *Erdle Perforating Co., Inc.*

For free copy insert No. 35 on postcard.

Turn to Page 162

use postcard below

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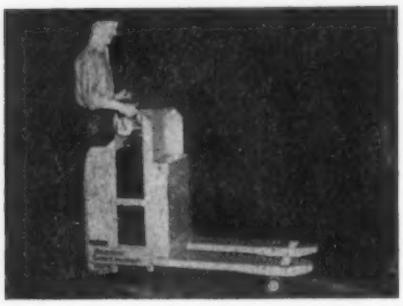
new equipment

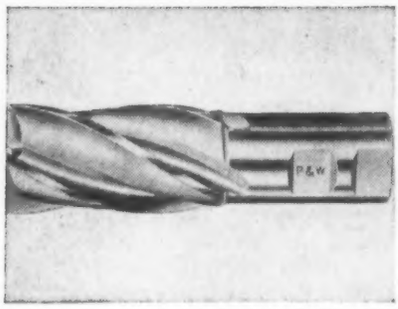
Continued



Rider type electric truck handles pallets

Single and double face pallets can be handled by a new rider-type low-lift electric truck. Known as the SpaceMaker Low-Lift, the truck speeds up handling by enabling the operator to ride while picking up and delivering unit loads. The truck travels 5 mph, with 4000 lb loads. Carrying frame is 30 to 60 in. long x 24, 27 or 30 in. wide. Forks may be raised 3¼ to 7¼ in. The truck uses a 12 v battery. *Lyon-Raymond Corp.*

For more data insert No. 5 on postcard.



New end mills made for heavy duty

Heavy duty end mills with 2-in. diam shank and fast-cutting helix are of rugged design and have ample chip clearance for taking heavy end milling cuts. They are suited also for Kellering, die sinking and similar work. Shanks are of the Weldon type and have two set screw flats for positive drive. Cutters range from 2 to 2½ in. diam in length of cut from 4 to 6 in. They are made of high speed steel with right hand cut and right hand spiral flutes. *Pratt & Whitney, Div. Niles-Bement-Pond Co.*

For more data insert No. 6 on postcard.

Metal-rubber bonding

Surface preparation of steel parts before they are rubberized has been speeded up to effect a worthwhile cost saving. A matte finish is put on the parts in an airless blasting machine so that a good bond between the metal and rubber will result. An operator loads work into the 2 cu-ft-capacity barrel of the machine, and an endless apron-type work conveyer continually draws pieces up from the bottom of the load and gently cascades them over the top of the load where they are subjected to the full and concentrated blast of metallic abrasive. *American Wheelabrator & Equipment Corp.*

For more data insert No. 7 on postcard.

Motors with resilient base

GE's Tri-Clad line of single-phase, capacitor, induction motors is now offered with a resilient-base construction. For use where freedom and extra-quiet operation are required, the construction is available on motors rated from ½ to 5 hp. Dynamically balanced for smooth operation, the Tri-Clad motor offers triple protection against physical damage, electrical breakdown, and operating wear and tear. *General Electric Co.*

For more data insert No. 8 on postcard.

Turn to Page 38

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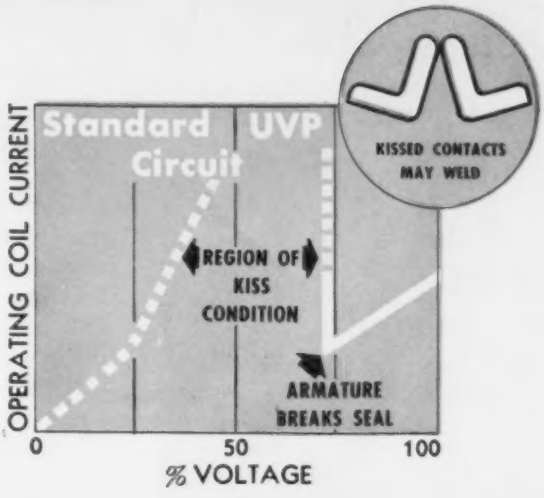
WHEN VOLTAGE DIPS—

Here's what happens with the Standard Under-Voltage Protection Circuit:

1. Motor Starters open *lazily* when voltage drops (20 to 30% below normal).

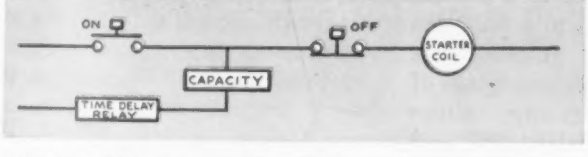
2. Contacts may weld due to reduced spring pressure under low-voltage conditions.

3. When there is a complete loss of voltage, pressing buttons to restart essential motor drives is costly and time-consuming.

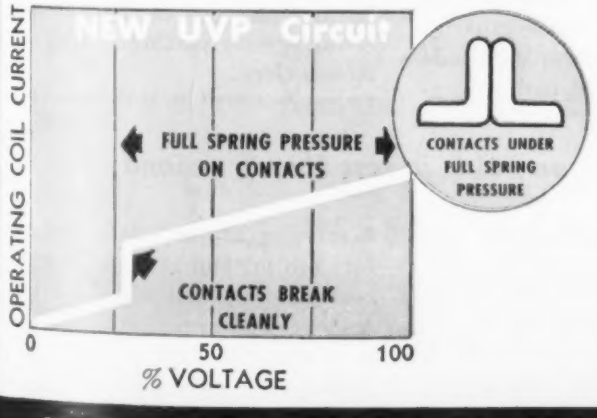


BUT NOW...

A.C. Motor Starters are Electrically Locked-in and Will Start Automatically (If Normal Voltage Returns in 2 Seconds or Less)



Simple circuit — no mechanical latches or levers on starter-armature. Only the holding circuit is changed — time-delay of the holding circuit obtained by a simple relay of standard construction having one coil.



NO WELDING OF CONTACTS

This new time-delay UVP circuit uses standard 3-wire Push Button and gives these *advantages:*

1. Starters stay closed under full spring pressure down to a low voltage.

2. When voltage drops to about 75% below normal, contacts break cleanly in opening.

3. Essential drives keep running—by means of an exclusive control method motors *automatically restart* if voltage returns in 2 seconds or less.

Both low and high voltage EC&M Motor Starters are available with this new EC&M UVP Circuit.

WORTH LOOKING INTO—

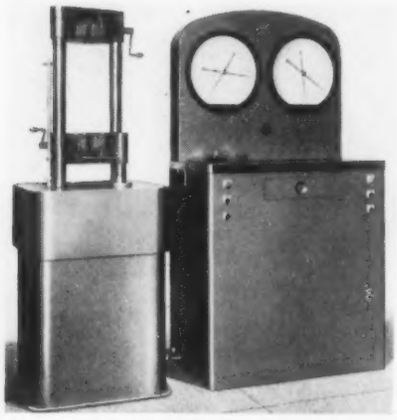
ask for Accelerator Bulletin No. 30

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

new equipment

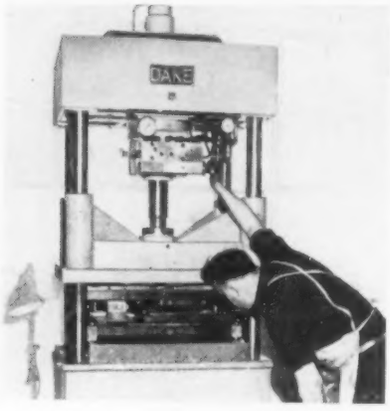
Continued



Low-cost testing machine has 12,000-lb capacity

Features of larger Baldwin testing machines are found in this improved, low-cost, universal testing machine. The hydraulic loading unit is separated from the indicating and control unit, which isolates recoil from breaking test specimens and permits adjusting maximum or lazy hands with minimum drag. A rigid, two-column design with 9½ in. clear lateral space between columns gives high accessibility in handling specimens and simplifies observations. Load (either in tension or compression) is applied upward by an integrated piston and elevating cage. Vertical distance between gripping heads may be set anywhere from 1 to 21 in. including 8-in. stroke. Table is arranged for transverse testing. Two ranges are provided. *Baldwin-Lima-Hamilton Corp.*

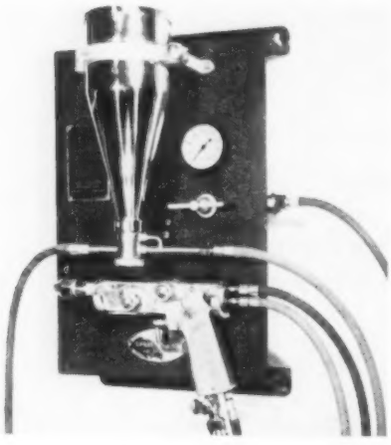
For more data insert No. 9 on postcard, p. 35.



Presses for die try-out and limited production

A new series of hydraulic presses has been designed for use in die matching. They may also be used for short production runs, and for manufacturing samples. Both single and double-acting designs range from 25 to 125 tons capacities. Models are actuated by a simple hydraulic mechanism, that is operated by electric motor, or by an air cylinder designed to attain maximum power and speed at 90 or 145 lb air pressure. Single-acting models are powered on the up stroke, and return to starting position by gravity. The double-acting models are powered on both up and down strokes and are provided with a rapid advance mechanism that operates until the press is brought under load, automatically changing to power advance for the remainder of the stroke. *Dake Engine Co.*

For more data insert No. 10 on postcard, p. 35.



Spraywelder incorporates many new features

Model B Spraywelder is a powder metallizing unit used to execute the Colmonoy sprayweld process. The process applies uniform overlays of Colmonoy hard facing alloys using metallizing procedures, and then subsequently bonds the overlay to the base metal. The Spraywelder is lightweight, has eye level air gage, and new greater capacity air filter. Other features include more positive air and powder control valves, new trigger mechanism, finger tip control with lock for continuous or intermittent spraying. Increased cooling chamber in the head insures steadier operation and longer tip life. Locked feed mechanism on carburetor eliminates possible change in powder feed setting. In addition, the Spraywelder can be used to apply metal powder castings. *Wall Colmonoy Corp.*

For more data insert No. 11 on postcard, p. 35.

Machine solders or welds in less than a second

A new resistance spot welding and soldering machine equipped with timer speeds production, cuts costs, eliminates shrinkage in the manufacture of instruments and small products. The machine silver solders, soft solders and spot welds precious and dissimilar metals. Setup time for various production operations is simple and rapid. Electrodes are especially designed for each job and have spring-action controlled operation. When electrode arms are closed, work is held firmly in position during soldering and cooling. An automatic cutoff timer regulates soldering time. *Joyal Products, Inc.*

For more data insert No. 12 on postcard, p. 35.

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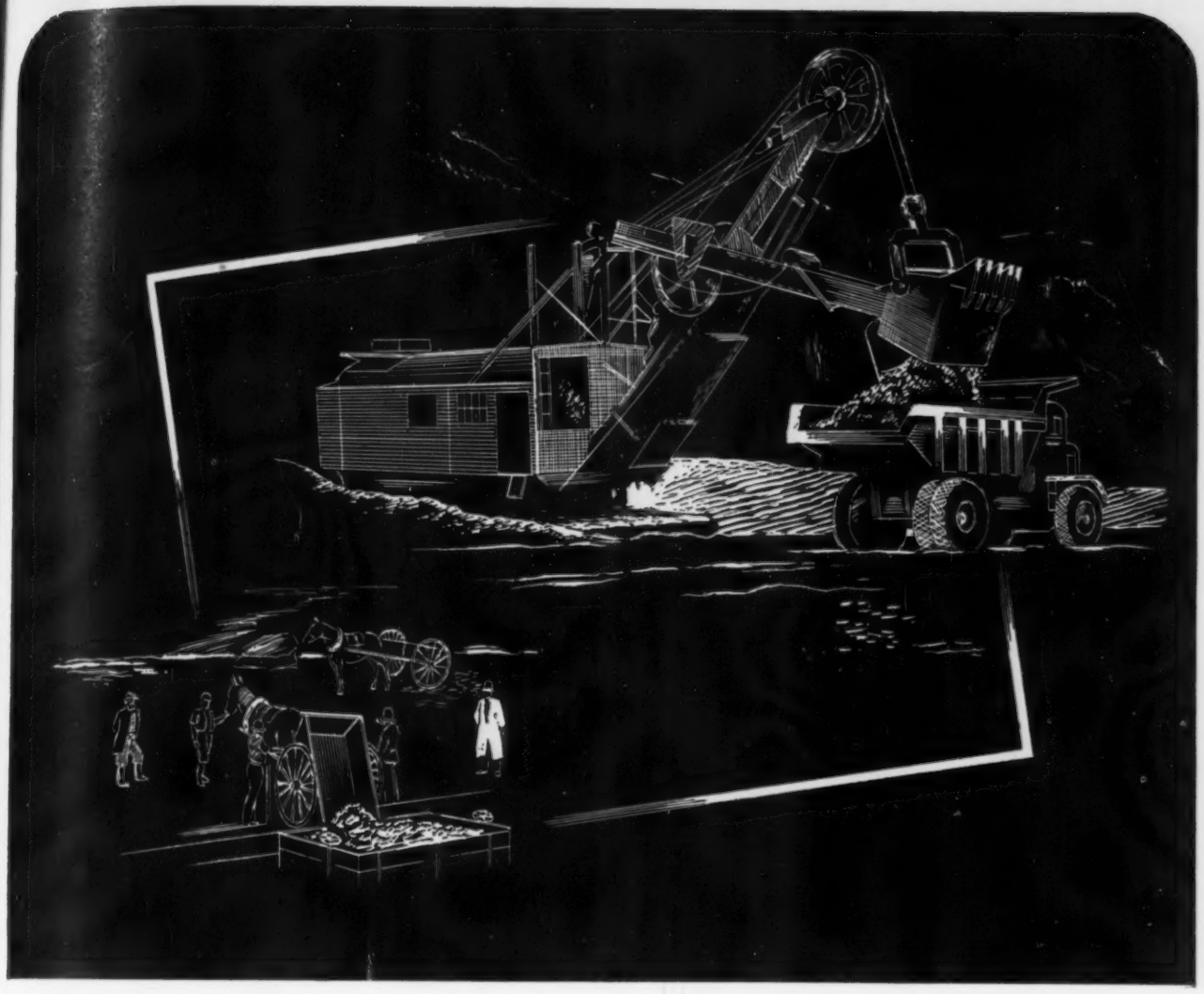

SINCE 1850

THE IRON ORE INDUSTRY

has kept pace with the demands of science and industry in the production of ferrous metal. Through four great wars and through the greatest century of mechanical development in the history of mankind it has met and satisfied every demand that has been made upon it.

LAKE SUPERIOR IRON ORE • FERRO ALLOYS
VESSEL TRANSPORTATION • COAL

THE Cleveland-Cliffs IRON COMPANY

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

IRON AGE *introduces*

L. R. Gustin, appointed superintendent of the Los Angeles bolt and nut plant of BETHLEHEM PACIFIC COAST STEEL CORP. Mr. Gustin succeeds **Robert Morgan** who has retired after 25 years with the company.

Thomas E. Egan, promoted to research metallurgist of the COOPER-BESSEMER CORP. Mr. Egan's successor is **W. R. McCracken** who will be in charge of the foundry research laboratories in Grove City, Pa.

Roy P. Tooke, appointed manager and **E. T. Mitchell,** general superintendent of the Butler Div. of ARMCO STEEL CORP., Butler, Pa.

Don M. McCutcheon, named manager of the physics department, scientific laboratory of the FORD MOTOR CO., Dearborn, Mich.

John P. Kadlic, appointed Philadelphia district sales manager for the wire rope division of JOHN A. ROEBLING'S SONS CO. Mr. Kadlic was the company's sales representative in the St. Louis area.

George V. Luerssen, appointed vice-president in charge of metallurgy of the CARPENTER STEEL CO., Reading, Pa. Mr. Luerssen succeeds **B. H. DeLong** who is retiring after 41 years of continuous service with the company. **Dr. Carl B. Post** advances to the position of chief metallurgist and **George E. Brumbach** becomes metallurgist.

J. D. Brick, appointed district manager, Pittsburgh of the ELECTRIC CONTROLLER & MFG. CO.

Frank E. Watts, Jr., appointed assistant metallurgist for HUNT-SPILLER MFG. CORP., Boston.

William J. Fleming, appointed manager of the construction equipment sales division of WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J.

L. F. R. Bellows, Jr., named vice-president and **Byron D. Kuth,** secretary-treasurer of the BELLOWS CO., Akron, Ohio. The same officers were likewise named for the Bellows Electric Sign Corp., and Bellows Products, Inc.

Robert K. Follansbee, named to succeed **John Follansbee** as a member of the board of directors of FOLLANSBEE STEEL CORP., Pittsburgh. Mr. John Follansbee's retirement ends 65 years of activity in the steel industry.

Palmer E. Hanson, appointed sales field engineer for the machine division of the OSBORN MFG. CO., in Milwaukee. Mr. Hanson replaces **J. C. Alberts** who has been recalled to military service.

Robert T. McMahan, named plant manager of the BOYE & EMMES MACHINE TOOL CO., Cincinnati.

Paul E. Palmer, joined the sales organization of METAL & THERMIT CORP., E Chicago, Ind., as a special representative assigned to welding machine sales.

Thomas R. Williams, joined the sales staff of FREDERIC B. STEVENS, INC., to represent the company in eastern Ohio.

A. C. Dehnel, assumed the responsibilities of export manager of the PREAKNESS ENGINEERING CO., Newark, N. J.

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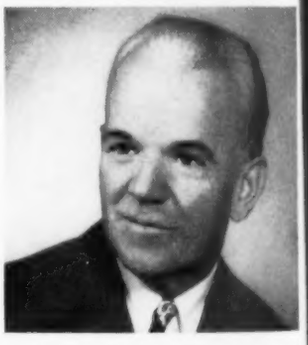
HERBERT B. LINK, named president of the Bellows Co., Akron, Ohio.



P. M. FLEMING, appointed president of Pittsburgh Rolls Div. of Blaw-Knox Co.

S. J. MORAN, appointed president of Union Steel Castings Div. of Blaw-Knox Co., Pittsburgh.

J. P. Haight, named general mana-

IRON AGE

salutes

Frank K. McDanel

FRANK McDANEL, president of American Bridge Co. and Virginia Bridge Co., likes to be on the move. No one will ever accuse him of having a shiny seat on his pants. He can't sit still that long.

When Frank is anywhere near a big construction job he can't resist the temptation to sidewalk superintend. He likes to be where things are being built. He started out that way when, at 15, he took his first job with American Bridge in 1904. He sees no reason to change.

One of the nice things about Frank is his ability to be humble and at the same time turn in a good job as an administrator. That's the first thing people close to him mention.

Folks say, "Stop around and meet the guy and you'll know what we mean." In his quiet way he likes people and they in turn like him.

Frank came up the hard way. His first job was as layerout helper at the Ambridge plant of American Bridge. In succession he became foreman and superintendent of the Ambridge operation, vice-president in charge of manufacturing, and in 1946, president of the two companies.

He's a good golfer and can shoot in the 80's when he sets his mind to it. He's also a pretty fair duckpin bowler. Trouble is he can't find as much time for either sport as he once did. Being boss has its shortcomings.

WALTON B. SOMMER, elected vice-president of the Keystone Steel & Wire Co., Peoria, Ill.

PAUL W. SOMMER, elected treasurer of the Keystone Steel & Wire Co., Peoria, Ill.

J. E. BOWEN, appointed a vice-president of the Great Lakes Steel Corp., Detroit.

EUGENE P. CUNNINGHAM, appointed sales manager, Clearing Machine Corp., Chicago.

IRON AGE *introduces*

Continued

Frank A. Little, appointed director of purchases of the KEYSTONE STEEL & WIRE CO., Peoria, Ill. Other appointments: **Ford P. Schusler,** sales manager, industrial division and **William H. Getz,** manager merchant sales.

L. F. Hartwig, elected vice-president — manufacturing of the CHICAGO MALLEABLE CASTINGS CO., Chicago.

J. T. Llewellyn, II, elected president of ALLIED STEEL CASTINGS CO., Chicago. **L. J. Wise** was elected vice-president, and **L. F. Hartwig** assumes the title of assistant to the president.

John W. Dixon, named executive vice-president of the CLEVELAND GRAPHITE BRONZE CO., Cleveland.

Berwick C. Barton, appointed superintendent of the seamless tube mill, Chicago district of REPUBLIC STEEL CORP.

J. E. Polhemus, appointed representative in southern and eastern Wisconsin for DETROIT BROACH CO. Mr. Polhemus will make his headquarters in Milwaukee.

Dr. Melvin Fields, promoted as associate technical director and appointed to the management staff of TRACERLAB INC., Boston. **Robert T. Bogner** was named industrial relations manager and **Ralph W. Brown** was appointed industrial engineer.

Fred Brink, Jr., appointed general sales manager for the U. S. for the BRINK & COTTON MFG. CO., Bridgeport, Conn.

H. C. Gross, appointed chief chemist of ADAMAS CARBIDE CORP., Harrison, N. J.

I. C. Raymond Atkin and **Lewis W. Douglas,** elected to the board of directors of INTERNATIONAL NICKEL CO. OF CANADA, LTD., New York.

J. E. Hill, promoted to superintendent of the Fairfield tin mill of TENNESSEE COAL, IRON & RAILROAD CO. **C. D. Michaels** promoted to assistant superintendent of the tin mill. **John R. English** was promoted to superintendent of the tin house.

J. P. Haight, named general manager of the fabricating division of the ALUMINUM CO. OF AMERICA, Pittsburgh.

John A. Baldinger, named general manager of the AUTOMATIC TRANSPORTATION CO., Chicago, a division of Yale & Towne Mfg. Co.

John Edward Brennan, appointed general manager of the Chrysler jet engine plant which will be under the direction and supervision of the Dodge Div. of CHRYSLER CORP., Detroit.

E. W. Ristau, appointed general manager of the OHLEN-BISHOP MFG. CO., Columbus, Ohio, a recently acquired subsidiary of the Rockwell Mfg. Co.

John D. Gordon, appointed general sales manager of MECHANICAL HANDLING SYSTEMS, INC., Detroit.

S. J. Merriman, appointed assistant to the general manager of the East Pittsburgh Div. of the WESTINGHOUSE ELECTRIC CORP.

John T. Edelen, appointed sales engineer, Cincinnati office of DRAVO CORP.'s machinery division.

Robert Irwin and **John F. Kennedy,** appointed superintendents of two jet engine manufacturing plants under construction at the Buick Motor Div., GENERAL MOTORS CORP., Flint, Mich.

Richard W. Sabine, named manager of distributor sales of the Mechanical Goods Div. of GOODYEAR TIRE & RUBBER CO., Akron, Ohio.

OBITUARIES

William E. Herb, vice-president in charge of sales of the Gifford-Wood Co., Hudson, N. Y.

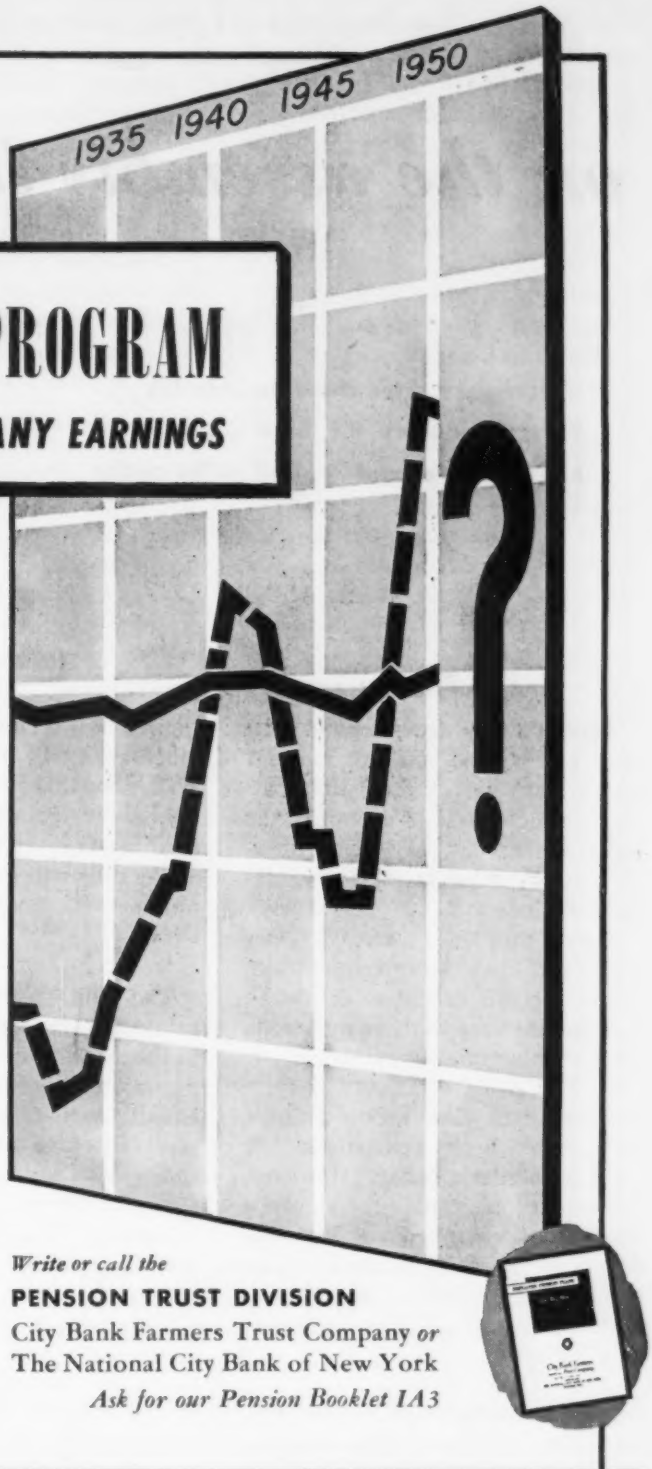
William D. Gilson, 64, production superintendent of the Robinson Clay Product Co., Akron, Ohio.

Harrison William Johnson, 60, manager of the truck tank division of General Steel Tank Co., Birmingham.

Charles F. Jenkins, 85, vice-president of Deemer Steel Casting Co., New Castle, Del.

Harold P. McCormick, Cleveland district manager of the Reliance Division, Eaton Mfg. Co.

Patterns in Pensions



YOUR RETIREMENT PROGRAM

SHOULD BE GEARED TO YOUR COMPANY EARNINGS

IF your company
EARNINGS ARE STEADY

Your company probably can afford the permanent commitment of an adequate pension system.

IF your company
EARNINGS ARE ERRATIC

Your company probably can best solve the retirement problem through a deferred profit-sharing trust—or a combination of a modest fixed pension commitment plus a profit-sharing retirement plan.

FIND OUT what plan
BEST fits your business

Let us help you with complete analyses, including cost estimates. There is no obligation, of course.

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on the assembly line

automotive news and opinions

Uncertainty grips the auto industry . . . Parts producers hit hard . . . Strike hits Hudson output . . . DSR strike costly

by Walter G. Patton

Detroit's Big Questions — This may not be the darkest moment Detroit has seen during the postwar period but it is certainly the most confused. Very large question marks overhang (1) the materials situation, (2) the market for new and used cars, (3) employment, (4) labor-cooperation. If any Detroit executive thinks he has the answers to these questions he is keeping mighty quiet.

Groping in the Dark — Detroit has never been pessimistic. It isn't pessimistic today. However, the amount of groping for answers that has been going on here recently is probably unsurpassed in the darkest periods of World War II or during the entire reconversion period.

Dismal Outlook—Take raw materials such as steel. The outlook for steel today is dismal, discouraging and uncertain. Set-asides for several products have hit 100 pct. Free carbon and alloy bar steel is now less than 20 pct of total production. Bar steel is the very guts of an automobile. It is used for gears, shafts, axles, crankshafts—the most vital parts of a car. Inventories are low and going lower.

How Much—How Long?—With threatened unemployment crowding its future market for cars, how much steel will the industry need? Will even this reduced amount be available? Smaller plants in Detroit are frankly worried about the shake they will get in Washington, particularly under an open-end CMP.

The Big Worry — The uncertainty about steel is not confined to the small industry supplier. The big automobile producers have an equally serious problem. The bar steel shortage has hit them, too. Conversion sources are drying up. Dwindling scrap supplies plus the exodus of foundries to more fertile fields are contributing to the fadeout.

Reduced auto schedules will undoubtedly result in some conversion cancellations. The net effect of (1) reduced scrap generation, (2) lower car production, (3) greater diversion of materials to defense can actually mean a substantial loss in total steel production in the nation. This isn't the Detroit prediction but it is a Detroit worry, particularly by those who feel Washington still hasn't made many of its tough decisions and government controls inevitably lead to mass unemployment and a depressed consumer market.

On the Mourner's Bench—There was a time when the steel industry was pretty generally accused of selling the car market short. Today, the steel industry has company. Lots of company. Occupying front row seats on the mourner's bench are many vendors who are still turning out parts but see the end of the line just ahead. These companies are playing out the string. They always have to keep a month or two ahead of the industry. Some have had their releases cut 50 to 75 pct. This means one thing—sooner or later there will be mass layoffs in many of Detroit's smaller plants.

Manpower—Another Problem—Another fear of the parts manufacturer is that he will permanently lose his skilled help. Temporarily unemployed workers will take jobs elsewhere. With anticipated wage controls, the chances of coaxing the worker back is just about nil. In the long run, Detroit's No. 1 problem will be manpower. Everybody knows this. Everybody's doing what he can to protect his working force. Ability of the small company to hang on until defense catches up is limited. The small manufacturer is also the least fortified at present with defense orders. Stampers and screw machine producers are particularly hard hit.

assembly line

Continued

More Layoffs Expected — There have already been substantial layoffs in Detroit. The trend in this direction is expected to increase during July. Washington is all assurance that unemployment will be of short duration. The Detroit worker is not nearly so confident. All of which may explain some of the labor unrest in Detroit today.

Slowdowns or Speedups—The labor picture in many Detroit plants is not pleasing. Hudson has had a 22-day running rash of what the company calls "slowdowns" and the union calls "speedups". The two sides in the dispute are just about as far apart as their descriptions of what is taking place.

Bodies come through the assembly line incomplete. The company sends the workers home. Next day the same thing is repeated. Labor charges management is laying off employees unnecessarily. Management says the workers are making no effort to earn their annual improvement factor bonus.

Improvement Factor Can Work —This should be noted: the rhubarb is not going on in GM plants. The annual improvement factor is still working at GM where it originated. One can hardly say it is working at Chrysler which has been bedeviled with production interruptions for the past month or two.

Will Trouble Come?—The Ford labor picture is different. Experts agree Ford's labor trouble is primarily politics—probably at its worst. John L. Lewis has done what he could to whip up any dissatisfactions that were overlooked by the left-leaning officers of Local 600. It is not a pretty picture. It is not an easy situation to handle. So far, Ford is managing to live with it. However, the Ford labor situation has many discouraging elements in it. There could be trouble. Nobody really wants trouble at the Rouge—excepting the Commies—but it may come.

Tool Builders Happiest—Where are the happy people in Detroit today? If such there are, you will probably find them in machine tool establishments. These shops are loaded—as never before in their history. Their unfilled orders run for miles beyond the horizon.

However, these shops, too, have their problems. They can't get enough steel or electrical supplies. Everybody wants his machine day before yesterday. There is a constant threat that Washington may push government work ahead of civilian orders already in process. If this happens, a financial settlement must be made.

The industry is not downhearted. However, like the rest of Detroit, the machine tool industry is also confused—thoroughly confused. At the moment, there seems no end to the uncertainty that completely engulfs all segments of Detroit's metalworking trade.

GMC Services Display — GMC Truck & Coach Div. staged the largest display of equipment so far exhibited in this area last week. After a press showing on Friday, the equipment was moved to Walled Lake Park where it was shown to GMC employees and the public.

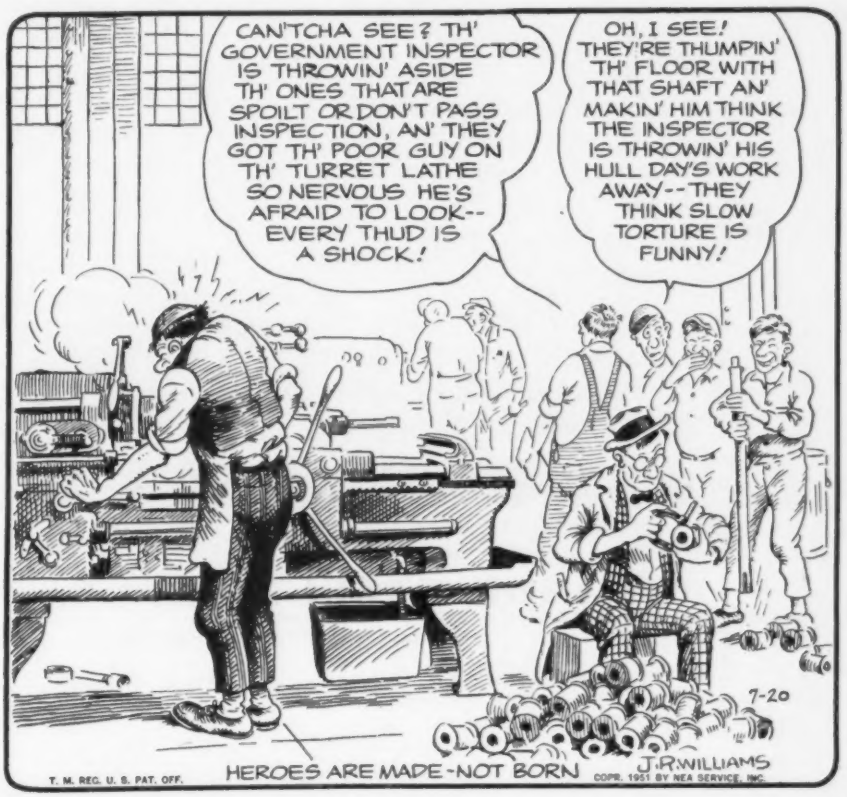
Included in the display were a cutaway of the submarine steam-driven torpedo, bomb sights, mines, depth charges and guided missiles. There were anti-aircraft gun emplacements, tanks, tank retrievers, artillery pieces and ammunition.

Two jet planes were on display as were two cutaway jet engines. There were three-dimensional exhibits. An F-80 "Shooting Star" was shown to the visitors.

Other exhibits included an experimental XF-85 jet plane with a wing span of 21 ft. Variable-pitch propellers, air-sea rescue equipment and exhibits showing the Pacific Air Lift at work were shown.

Exhibits were assembled by energetic Roger M. Keyes, general manager of GMC. It was quite a show, everybody agreed.

THE BULL OF THE WOODS — By J. R. Williams


CAN'TCHA SEE? TH' GOVERNMENT INSPECTOR IS THROWIN' ASIDE TH' ONES THAT ARE SPOILT OR DON'T PASS INSPECTION, AN' THEY GOT TH' POOR GUY ON TH' TURRET LATHE SO NERVOUS HE'S AFRAID TO LOOK-- EVERY THUD IS A SHOCK!
OH, I SEE! THEY'RE THUMPIN' TH' FLOOR WITH THAT SHAFT AN' MAKIN' HIM THINK THE INSPECTOR IS THROWIN' HIS HULL DAY'S WORK AWAY-- THEY THINK SLOW TORTURE IS FUNNY!
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Expanding military requirements call for an ever increasing number of these helmets. As in World War II, a large percentage of them will be made from Sharon special deep drawing helmet steel.

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SHARONSTEEL

west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

New Spring Steel Alloy — Two competitive western steel producers—Bethlehem Pacific Steel Corp. and Kaiser Steel Corp.—cooperated with United States Spring and Bumper Co., of Los Angeles, to produce what is believed to be the first new alloy developed on the West Coast.

A new chromium-molybdenum-vanadium spring steel is now being produced by both companies to specifications developed under direction of Edgar Brooker, chief metallurgist for U. S. Spring and Bumper. Climax Molybdenum Corp. and Vanadium Corp. of America assisted.

More Ductile — More ductility than chrome-manganese spring steels and freedom from excessive "decarb" tendencies of silico-manganese spring steels are claimed for the new alloy named "Rauenloy" (John B. Rauen is president of U. S. Spring). Leaf springs for medium duty trucks is the primary end product, and it will also be used in agricultural cultivating tools.

U. S. Spring and Bumper is now producing springs for more than 40,000 motor vehicles monthly. Bethlehem Pacific is now rolling the new alloy exclusively for the company which sells springs, bumpers and other equipment to Ford, General Motors, Chrysler and Studebaker on the West Coast.

High Efficiency — Five open-hearths with a rated ingot capacity of 20,000 net tons of steel per month at the South San Francisco plant of Bethlehem Pacific last month produced 24,534 tons — a new record for the third time in eight months. W. C. Eshelman, general superintendent, credits the efficiency of the operating crews for the record.

Casting the Die? — Government agencies—from the Army through to the FBI—are showing interest in labor disturbances in the die-casting field in Los Angeles.

Companies responsible for approximately 90 pct of the defense die casting work in that area are being harassed by strike and threat of strike by the Mine, Mill & Smelter Workers Union which was expelled from the CIO in 1949. One shop is closed down; two others have had strikes called; and two are expecting walkouts. Wage demands over legal limits are being made.

Explosive Scrap — U. S. Coast Guard at Seattle last week halted unloading of a shipload of scrap from the Orient because of the potential explosive nature of the material.

Destined for the Isaacson Iron Works (which several years ago experienced an explosion in one of its electric furnaces) the material was found to include projectiles with detonators removed but still containing powder in the shells. Isaacson removed 2000 tons of structural material but 7000 tons remained aboard ship which was towed to an island anchorage. The scrap is the property of Commercial Metals, Dallas, Texas, and will probably have to be hand sorted before delivery.

Off to Japan — Shipments of high grade magnetite ore are to begin this month from deposits on Vancouver Island to Japan. Total contract is for approximately 400,000 tons at the rate of 80,000 tons per month.

Argonaut Co., Ltd., of Vancouver, B. C., a subsidiary of Utah Construction Co. of San Francisco, has spent more than $2 million for roadways and construction of a mill for magnetic segregation.

Coal Dust Controlled — One of the problems inseparable from continuous high-speed coal mining operations has been whipped at the Sunnyside coal mines of Kaiser Steel Corp. in Utah according to the Bureau of Mines.

A method of applying water and a wetting agent through cutting and conveyer heads on the mining machine to the working faces has been developed. This permits miners to work without respirators.

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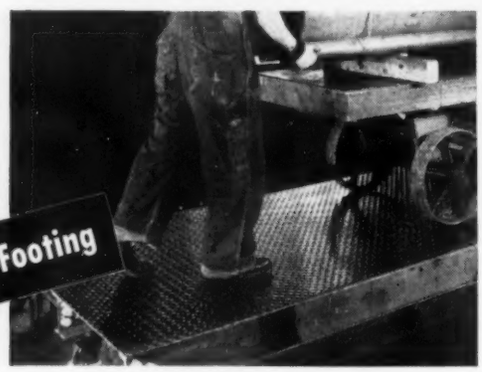

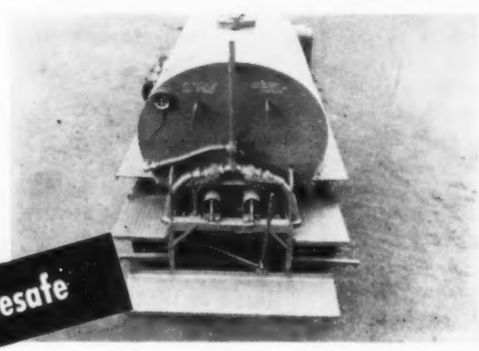

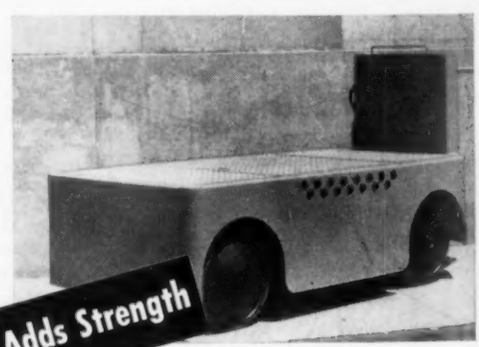

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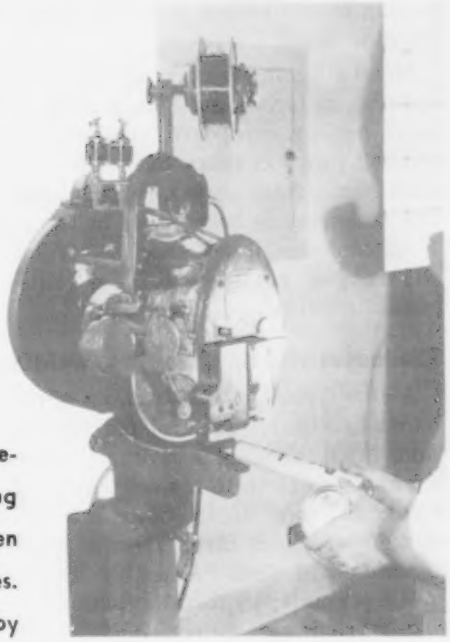
Stitch It Instead

Part I

THE IRON AGE
FOUNDED 1855
TECHNICAL ARTICLES

by A. G. Denne
Manager
Round Stitching Wire Dept.
Acme Steel Co.
Chicago



STITCHING a household sprayer.

Cheaper, faster metal stitching is replacing riveting and other joining methods in products ranging from autos to appliances, aircraft to toys. Production has been increased up to 700 pct at a cost of 9 to 12¢ per 1000 stitches. Shear and tensile strength is good. Stitching is easily done by unskilled operators. Equipment power requirements are very low.

Metal stitching has made possible production increases up to 700 pct, material savings to 50 pct and has eliminated many costly operations requiring skilled workers. Stitches are formed in approximately 1/5 of a second from coils of high-tensile steel wire. Since they form their own holes, prepunching or drilling operations necessary when joining components by riveting are bypassed. Also eliminated is the job of matching rivets to holes in successive layers of materials being joined together.

Stitching should not be confused with stapling. Stapling uses preformed fasteners while stitching cuts lengths of wire from a coil and forms each fastener as the stitch is made.

At production rates, wire costs are as low as 12¢ per 1000 for 7/16-in. crown stitches and 9¢ per 1000 for ¼-in. crown stitches. The crown dimension is the inside distance between the two stitch legs. Also, substantial material savings are possible because smaller flange areas are necessary with metal stitching than with riveting or spotwelding. For example, when joining similar 0.016, 0.032, and 0.051-in. sheets by spotwelding, flange widths of 5/16, 7/16, and 9/16-in., respectively, are necessary. However, when joining these and other gages of material by metal stitching, flange widths can be reduced to ¼ in.

Metal stitches have high shear and tensile strengths and are resistant to fatigue and vibration. Loading strengths of flat-clinched stitches are at least equal to those of rivets. The total cross-sectional area of the two legs of a single 18-gage flat-clinched stitch and the total shear load this stitch can withstand approximately equal one-third the total area and the shear load values of an ⅛-in., full-hard aluminum rivet.

Stitching consumes little power

Very little power is consumed by the stitching operation. Motors of 1/3 and ½ hp are more than sufficient for driving stitches through the maximum recommended material thicknesses. Dissimilar metals that are not readily welded, such as steel and aluminum, are very easily fastened by this method. Metal stitching does not remove galvanized coatings as do the attachment methods utilizing heat. Also, materials need not be cleaned prior to joining. Stitches applied to parts that have been painted do not disturb the finished surfaces.

Machine speeds range from 280 to 325 stitches per min. Operating speeds are considerably lower than machine speeds because of the time delay of setting up and positioning the work. On most production applications, operating

speeds of from 80 to 100 stitches per min can be attained. Other factors affecting operating speeds are the shape of the parts being joined, the number of stitches required per assembly, the speed of the machine being used and the mobility of the operator. As the time for set-up and positioning is diminished, operator speed approaches machine speed.

Metal stitching is currently in use joining nonmetallic materials such as canvas, rubber, plywood, leather, cardboard, asbestos, twisted paper and felt to a full range of metals. This includes aluminum, steel, brass, copper and stainless. The technique is being used in the manufacture of automobiles, buses, trucks, refrigerators, electric ranges, furnaces, toys, novelties, aircraft, metal furniture and other items.

Eliminates riveting, bolting, welding

A few typical metal-stitching applications are shown in Fig. 1. The Holland Furnace Co., Holland, Mich, eliminates riveting by metal stitching asbestos cloth to a steel furnace frame, Fig. 1-A. In this application, the stitch passes through and joins three layers of material—steel, asbestos, and steel. Assembly by riveting costs 17½¢ per unit; by metal stitching, 3½¢—a production saving of 80 pct.

Refrigerator drawers (B) are made by stitching 0.032-in. steel angle braces to the corners of 0.040-in., 24ST aluminum sheet with 7/16-in. crown, flat-clinched stitches. These drawers, manufactured by the Frigidare Div., General Motors Corp., were designed specially to take advantage of the metal-stitching technique. For this reason, no comparative production figures are available.

A spray gun (C) made by attaching a tinned steel tube to a wooden plug with a metal stitch, realizes a 69 pct cost saving over previous crimping and screwing methods. In this application, the stitch is driven through the metal, into the wood and is not clinched.

Saves 120 sec per joint

At the Burbank, Cal., plant of Bardwell & McAllister, Inc., 7/16-in. crown stitches are used to fasten rubber feet to aluminum ladder legs (D). In this application, the stitches pass through and join three layers—rubber, aluminum, and rubber. Total stitch penetration is ¼ in. of rubber and 0.093 in. of extruded aluminum channel.

Assembly by the former drilling and bolting method took 135 sec per joint. Metal stitching cut the assembly operation to 15 sec—a time saving of over 85 pct. Or, conversely, the old method took 800 pct more time than the present method. In addition to the cost saving resulting from the elimination of four screws, nuts and washers per leg, the joint has increased strength and rigidity.

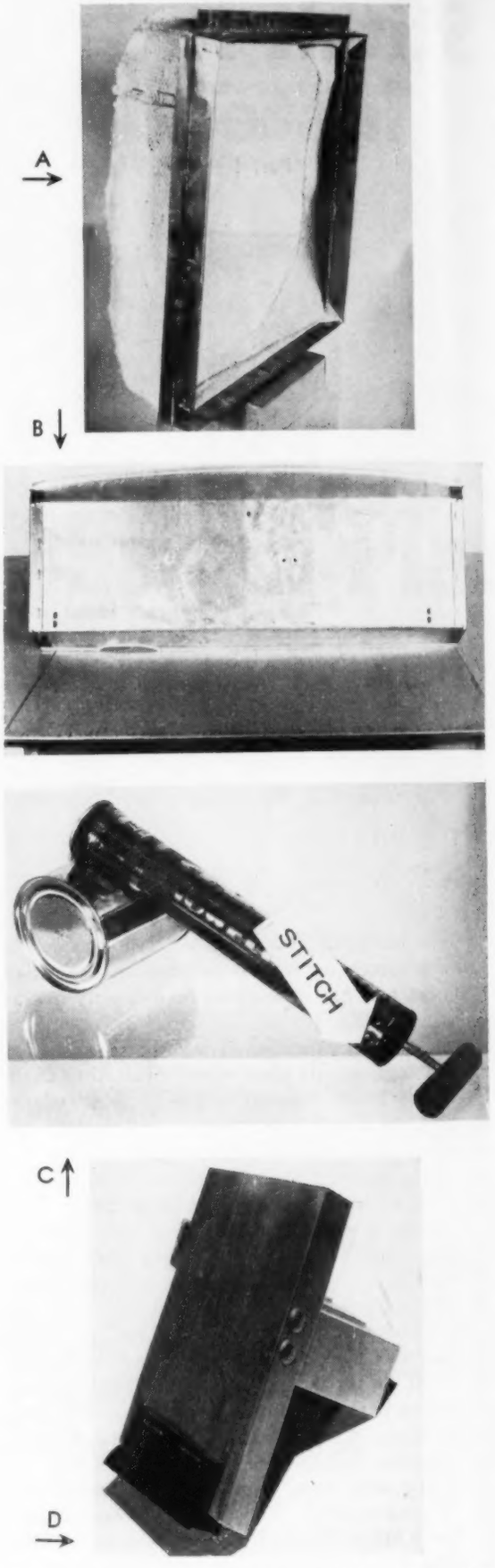


FIG. 1—A) Steel asbestos and steel joined together in a steel furnace frame; B) Steel corner braces stitched to aluminum refrigerator drawers; C) A spray gun's tinned steel tube attached to wooden plug; D) Rubber feet fastened to aluminum ladder legs.

The stitching wire commonly used falls into three sizes: 16-gage or 0.0625-in. diam, 18-gage or 0.0475-in. diam, and 20-gage or 0.0348-in. diam. Tolerances on wire diameters are to plus and minus 0.001 in. and the wire is not more than 0.001 in. out of round. More than 98 pct of the applications use the 18-gage wire. Of the remainder, 1.5 pct use the 20-gage wire and approximately 0.05 pct use the 16-gage wire.

Four nominal grades of high-carbon stitching wire are available. All are cold-drawn or cold-rolled steel. The first has a tensile strength range of from 220,000 to 249,000 psi; the second, from 250,000 to 289,000 psi; the third, from 290,000 to 319,000 psi; and the fourth, from 320,000 to 360,000 psi. All sizes and grades can withstand 180° bends without fracturing or breaking.

Available standard commercial finishes include: tinned, galvanized, liquor or bright finish. Corrosion-resistant wire is used for aircraft and other applications where aluminum is stitched. This wire has a 0.00125-in. coating of zinc on basic 18-gage, 290-grade steel wire and can withstand a 300-hr salt-spray test to AN-W-13 specifications.

For special applications, phosphor bronze, stainless steel and monel stitching wires are used. The phosphor bronze wire most commonly used is 18-gage, type S-54. The stainless type most commonly used is AISI 302 and is available in tensile strengths of 163,000 and 230,000 psi.

Four types of clinches

Two or more layers of materials can be joined by metal stitching with four types of clinches. These are: the standard loop clinch, the by-pass loop clinch, the outward loop clinch and the flat clinch, Fig. 2. The three loop clinches are formed with stationary, solid-die clinchers. The flat clinch is formed, after the stitch has been driven through, by folding the legs flat against the bottom material with an upward-moving clincher.

Stitch-forming begins when wire is fed from a coil through two feed rolls, running around a curved guide and through a straightener. A round shearing die and a pair of formers then receive the wire, where it is stopped by an adjustable wire stop. The shearing knife, attached to the knife holder, is actuated by a cam, cutting the wire as it is held in the round shearing die.

The wire, now cut to proper stitch length is carried under the formers by a mandrel. As the formers are forced downward, they bend the wire over the mandrel and thus form the stitch. After stitch formation, the mandrel is returned to its original position to receive the next stitch. The formed stitch, now held and positioned in the guide ways of the formers, is brought down to the work through which it will be driven.

Stitch supported throughout driving

The formers clamp tightly on top of the workpiece and hold it in place during the entire stitching operation. A driver forces the stitch through the layers of material. During the driving operation a shoe supports the three inner surfaces of the formed stitch. The former supports the outside of the stitch legs and the driver supports the top of the stitch crown while penetration is completed.

A spring-actuated roller follows the cam contour on the back of the shoe. This allows it to be withdrawn at a rate that offers no interference to the driver while providing full support to the crown and legs of the stitch until the legs pass through the workpiece thickness. The stitch is then completely driven through by the driver, seating the crown flat against the top material.

Next, while the crown is still held down tightly by the driver, a movable clincher from below, having a slightly curved grooved contour on its nearly flat top face, is forced upward against the slightly toed-in legs of the stitch. This action forces the legs flat against the bottom layer of the workpiece, completing the formation of a flat-clinched stitch.

Standard loop clinch used for most jobs

Loop clinches are usually used when the application is non-structural. Flat clinches are always used when the joint requires maximum strength. The standard loop clinch is used in 95 pct of all metal-stitching applications. Its crown size is normally 7/16 in. Both metallic and non-metallic

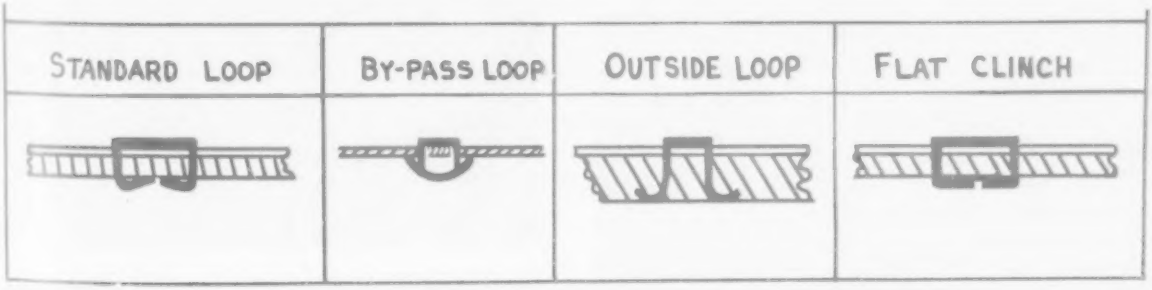


FIG. 2—The four types of metal-stitching clinches.

materials are fastened to sheetmetal sections with standard loop-clinched stitches.

By-pass and outside clinched stitches are usually furnished with ¼-in. crowns. The by-pass loop is used for assembling all types of metal and non-metal combinations. It is especially effective in attaching rods, small tubes, and springs to metal sections. The outside loop is used when it is desired to bury the stitch ends in non-metallic materials.

Flat-clinched stitches for most applications have 7/16-in. crowns. They are used wherever high ultimate strengths are necessary, such as in aircraft applications where joints are subject to severe stresses. However, the flat clinch is unsuitable for the heavier gages of steel or over ¼ in. of non-metallic material. This is because in the thicker materials the legs of the stitch tend to wander as they are driven through. This makes them miss the close-tolerance guide-ways in the lower actuated clincher.

Stitches with smaller crowns have increased columnar strengths, which slightly increase the machine capacity. For this reason, the use of ¼-in. crown stitches is increasing. Also, stitches with smaller crowns have a better appearance. Special crown sizes from as small as ⅛ in. to as large as 1.201 in. have been furnished to meet special requirements.

Five types of clincher profiles are used for forming loop clinches. The tear-drop profile, type A, is used in metal-to-metal and non-metal-to-metal combinations for clinching on the metal side. Profile depths available are: 0.051, 0.063, 0.078, and 0.106 in. The two-groove profile with one end closed, type B, joins both metals and non-metals to thin metal sections, clinching on the metal side.

Both the two-groove open profile, type C, and the four-groove open profile, type D, are used in metal-to-non-metal combinations when it is desired to imbed the standard loop clinch in the non-metallic material. The by-pass profile, type E, is employed primarily to form ¼-in. crown by-pass clinched stitches around bars and tubing up to ¼-in. diameter. However, it can also be used to clinch on flat metal.

The outward clinch profile, type F, imbeds ¼-in. crown, outward-clinched stitches in non-metallic materials. The extra rows of grooves make it possible to properly clinch the legs of the stitches, even if they wander, as in grainy materials.

Special equipment also made

These profiles are each available on a number of different clincher blocks. Specific uses and the need to be adaptable to several styles of clincher arms, or holders, has resulted in the creation of four standard types of clincher blocks. They are: the bar type, the large dovetail type, the small dovetail type and the raised type.

The bar-type of clincher block is double ended, except in Carboloy, and is available with profile types A, B, C or E. The large dovetail type is available with profiles A, D, and E.

The small dovetail type is available with profiles A, C, D, E and F. The raised type of clincher body is available with profiles C and E. In addition to these standard clincher bodies, special types have been designed for special purkva transformer. The unit also has superior poses. These profiles are shown in Part II of this article, which will appear next week.

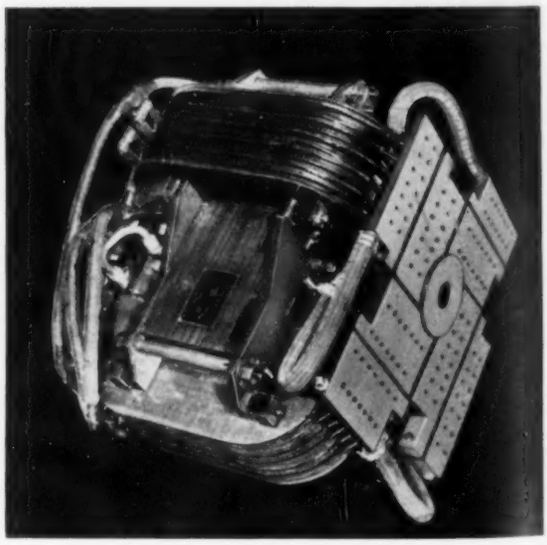
Low-impedance transformer ups welding speed

A new type of transformer has been developed by the Yoder Co., Cleveland, for its latest tube welder. It is expected to give lower power costs, and higher production from a unit of given capacity.

The new transformer is actually four small transformers arranged in an offset cross shape about a common core. All secondary paths within the transformer are through continuous copper, a feature not feasible in circular type transformers commonly in use.

The design reduces impedance to a point where one of the new transformers of 200 kva has a per cent impedance as low as an ordinary 50 kva transformers. The unit also has superior mechanical strength.

Low impedance cuts down the kva requirements, giving lower power costs. And, it permits higher production speeds from a welder of given capacity. Tests show impedance reductions of 15 to 20 pct compared with the best tube welders heretofore in use.



FOUR TRANSFORMERS, in offset cross shape around common core, up Yoder tube welder speed by lowering impedance. Mechanical strength is better, too.

Accurate timing essential for low-capacity spotwelding

FIG. 1—Welding a bit of 0.010-in. brass sheet to a switchboard lamp.

FIG. 2—Welding both legs of an auto headlight filament simultaneously.

Two case examples of low-capacity spot-welding jobs at Westinghouse Electric Corp.'s Lamp Div., Bloomfield, N. J., show that accurate weld time pays off on small jobs.

Accurate weld time is essential to prevent wire burn-out, and still make a good joint between the high-conducting, copper-bearing materials being welded in Fig. 1. The weld being made between tweezer prongs involves an 0.010-in. nickel-plated brass sheet on a typical telephone switchboard lamp. This welding operation has replaced a soldering operation that cost twice as much.

Dumet is a borated, copper-coated, nickel-iron material. A short, high-voltage pulse is provided by a Westinghouse synchronous spot timer to break down the insulating borax coating. This unit is a ½-cycle precision weld timer with heat control, designed to weld high-conductance material such as aluminum, copper, or copper plate. It also can be used for welding mild steel. Welding current is adjustable from 20 to 100 pct of full heat at ½ cycle.

Accurate timing is also essential in welding refractory metals such as tungsten and molybdenum. In Fig. 2 both legs of an automotive headlight lamp are being welded simultaneously, using a Westinghouse timer. Synchronous timing has improved quality and reduced rejects. The timer provides weld time control for low conductance materials. Time is adjustable from 1 to 10 cycles.

New process quickly removes surface defects on castings

Sand encrustations, fins, pads, chaplets or chill nails, and other forms of excess metal are said to be removed from castings quickly, easily and economically by means of an oxyacetylene method developed by Linde Air Products Co.

The new process, called Powder-Washing, utilizes a special blowpipe, equipped with external powder-washing attachment. With this apparatus, an iron-rich powder is fed through oxyacetylene preheat flames into a low-velocity oxygen stream where it burns and produces superheated liquid iron oxide. Heat from the combustion of the powder and from the slag simplifies and speeds the removal of metal and metal-sand mixtures. Wherever the powder-fed flame is directed against a casting, the metal surface is brought quickly to temperature, and then it is oxidized when blown away by the oxygen stream.

After Powder-Washing, the surfaces of castings are left smooth, clean and close to tolerance. There is no undercutting, and no torn metal.

The washing nozzle has a large center hole through which the low-velocity oxygen stream is discharged. Around the large hole is a ring of 10 preheat flame ports. The powder is discharged from a flat tube above the nozzle.

A pneumatic dispenser supplies the powder. Compressed air, regulated to 6 psi, carries the powder through a separate hose to the powder attachment mounted on the blowpipe. Other equipment used such as regulators, accessories, and oxygen acetylene supply, is the same as used with ordinary hand-cutting blowpipes.

The blowpipe is moved from side to side across the surface of the casting, in oscillations up to approximately 4 in. wide, depending upon the width of the surface being washed. The nozzle face is held about 2½ to 3 in. from the reaction zone, and the oxygen stream is directed against the casting face at a 20° to 35° angle.

OXWELD WASHING BLOWPIPE being used to remove excess metal and encrusted sand from a casting.

Boron Steels

a new era in alloy metallurgy

By D. J. Brown
Technical Editor

Part III Boron carburizing grades in heavy use . . . Show better fatigue and wear life than former grades . . . Distort more in heat treating

New boron carburizing grades 94B20, 94B17 and 80B20 are being used in ever increasing tonnages. Fatigue and wear tests show the new grades superior to former highly alloyed steels. Boron steels distort more in heat treatment but distortion is consistent and can be countered.

Much of the actual production experience to date on the new boron carburizing grades has been with the 94B20, 94B17 and 80B20 grades. Timken-Detroit Axle Co., Detroit, has used over 50 full heats of 94B20 and 94B17 for hypoid gears from 9 to 15 in. diam. These parts were formerly made from 4620 and Timken reports that the boron steel is equal or better in this application than the former steel.

Fig. 12 shows the core hardenability spread on 38 heats of 94B20 made by Republic Steel Co. Five of these heats were low side chemistry and these heats are the ones which tested below the minimum of the 4820 H band shown. Timken-Detroit Axle has tested 15 gear sets in the three sizes shown in Fig. 13 made from 94B20. The sets, dynamometer tested by Timken, show that the 94B20 parts are equal to or better than the same parts formerly made from 4620. These tests were run at high load, high torque and low speed.

The 94B20 consistently quenches out in direct quenching after carburizing to Rc 60 to 67 on the surface and Rc 50, 0.050 in. beneath the surface with their processing. Usually boron steels show higher hardnesses for the same depth below the carburized surface than the same grade without boron. For instance, comparing 94B20 with 9420, the J60 hardness is 0.010 in. deeper in the case of boron than in non-boron steels.

Table IX shows results of tensile and impact tests on a carburized heat treated 94B20 billet and a forged pinion blank. Case hardness gradients on three grades, 94B20, 8622 and 4620 are shown in Fig. 14. These tests were run on 2.7 pitch hypoid pinions 1¾ in. length of face, having a bearing diam of 1 15/16 in. The required minimum hardness at the root and pitch line as well as the case depth are shown in the inset of Fig. 14. Recently Timken has changed from 94B20 to 94B17 because the 94B20 sometimes possessed too much hardenability.

The only other problem with

TABLE IX

TENSILE BAR RESULTS

Grade—94B20

Heat Treatment: Pseudo-carburized and oil quenched from 1725° F

Chemical Analysis: 0.21 C 0.84 Mn 0.40 Ni 0.44 Cr 0.12 Mo

Test Piece No.	Tensile Strength psi	Yield Strength psi	Elon. pct	Red. of Area pct	Hardness Rc Center	Hardness Rc ½ Radius
1	191,000	159,000	14.25	53.2	45	45
2	183,600	152,000	14.25	55	45	43
3	185,800	153,500	11.84	56.8	43	43
4	188,500	156,000	13.4	50.65	43	43
Average	187,225	155,125	13.44	53.91	43	43
5*	166,000	137,500	13.6	54.7	38.5	41
6*	165,500	136,500	13.6	53.7	38	40.5

Izod Notched Impact Results

Heat Treatment: Pseudo-carburized and oil quenched from 1725° F		Heat Treatment: Pack carburized and oil quenched from 1725° F	
Impact strength, ft-lb		Impact strength, ft-lb	
1 - 68.5	4 - 65	1 -	4 - 11
2 - 75	5 - 67.5	2 - 9.5	5 - 11
3 - 69	6 - 68	3 - 7	6 - 11
Average 68.7		Average 9.9	
Center hardness	43 Rc	Center hardness	43 Rc
		Surface hardness	65 Rc
		Case depth	0.052 in.

* Tensile samples 1 through 4, as well as all impact samples were made from the same piece of 4½-in. square stock. Tensile samples 5 and 6 are from the shaft section of a forged pinion blank.

Courtesy Timken-Detroit Axle Co.

either steel 94B20 or 94B17 at Timken has been distortion. These steels distort more than the 4620 grade. Typical longitudinal runout on 100 pinions is shown in Fig. 15. The usual range of distortion is in the order of 0.005 to 0.028 in. on test bars which are run as standards in the heat treat shop. Also, the bores of gears made from the new steels have closed in as much as 0.012 in. in 8¼ diam, 2 to 3½ pitch gears. In the boron steels, distortion is consistent, however, so that it can be planned for and easily corrected on the gear cutting machines before heat treatment. Use of proper expanders has taken care of bore shrinkage.

This shop reports that the machinability of 94B20 and 94B17 gears is as good as the old grade. Tool life, surface finish and tool regrinds have not changed since the new gears have been put in production.

Countershafts and bevel drive pinions are

FIG. 13—Three types of gear trains for driving the axles of 1 to 2½ ton trucks. At the left is a single reduction set used for average truck applications. A double reduction 2-speed train used for off the road vehicles is shown in the center. At the right is a regular double reduction gear train for pulling heavy loads. All these gears are now made of 94B17 carburized steel. Courtesy Timken-Detroit Axle Co.

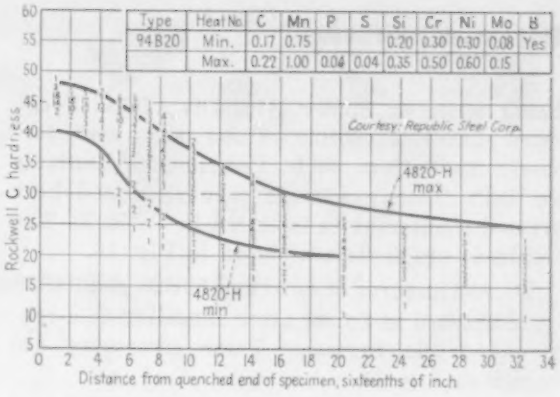
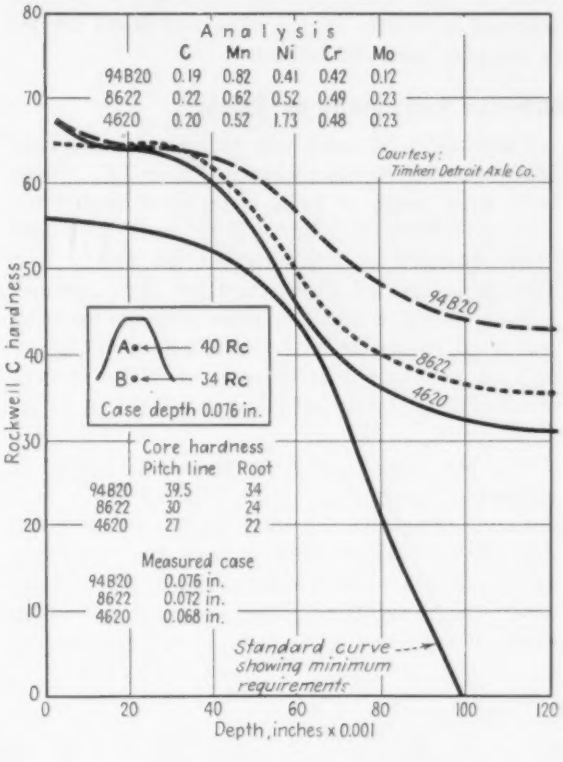
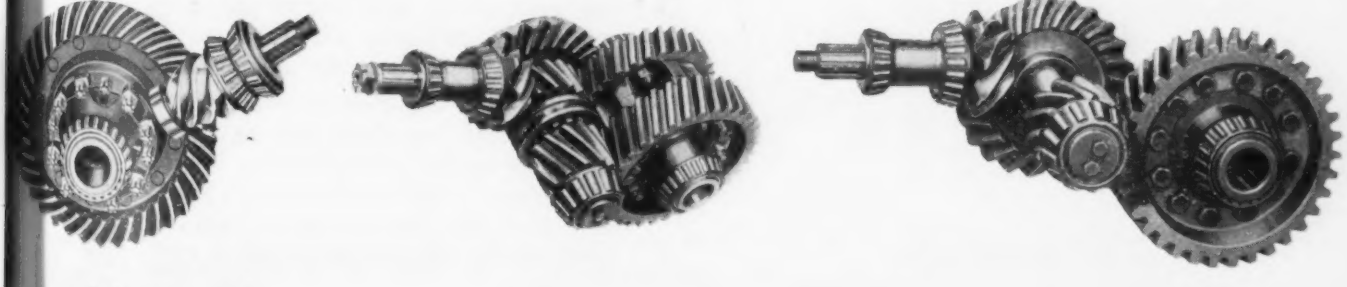

Type | Heat No. | C | Mn | P | S | Si | Cr | Ni | Mo | B
94B20 | Min. | 0.17 | 0.75 | | | 0.20 | 0.30 | 0.30 | 0.08 | Yes
Max. | 0.22 | 1.00 | 0.04 | 0.04 | 0.35 | 0.50 | 0.60 | 0.15
Courtesy: Republic Steel Corp.
4820-H max
4820-H min
Rockwell C hardness
Distance from quenched end of specimen, sixteenths of inch

FIG. 12—Hardenabilities of 38 production heats of 94B20 compared with the 4820 H band. These are core hardnesses only. The tests which fell below the minimum band limit were caused by the very low side chemistries of five of the 38 heats reported here.

FIG. 14—Case hardness gradients of three steels carburized and quenched together. The minimum hardness required v. depth is shown for these heavy-duty hypoid pinions on the heavy line. For satisfactory service, the hardness must exceed these calculated minimum values.





being made by Spicer Mfg. Div., Dana Corp., from carburized 80B20. These parts were formerly made from 8620. Comparative hardness on both these grades in carburized and heat treated countershafts is shown in Table X. The hardness gradients are shown in Fig. 16.

Microstructures of 8620 and 80B20 and 94B20 were checked at Spicer after annealing in a continuous cycle furnace. These structures are shown in Fig. 17.

The furnace cycle was: heat to 1700°F and hold 1 hr, cool to 1200°F in 40 min, hold at 1200° to 1175°F for 3 hr. Bars of each steel 1½ in. diam were run through the furnace on the same tray along with regular production gears.

Comparative hardness of the carburized case of 8620 and 80B20 is shown in Table XI. These tests were taken on 1 in. diam bars carburized at 1700° to 1650°F in a continuous gas carburizer and quenched in well agitated oil. Temperatures in the second furnace zone were successively reduced from 1650° to 1600° and 1500°F. The 8620 grade consistently shows more retained austenite in the case and more ferrite in the core than did 80B20.

Nitrided tests made by Spicer

Carbo-nitrided tests run at Spicer comparing 8620 with 94B20 are shown in Table XII. These tests were made on 1 in. diam bars heated for 4 hr at 1700°F, 1½ hr at 1700° to 1550°F and then quenched as indicated in the table. The bars were treated in a small pit type furnace with a sealed retort and the atmosphere used was 9 cu ft per hr of Rx gas, 2.5 cu ft per hr natural gas and 1 cu ft per hr NH_3. Microstructures on these bars are tabulated in Table XIII.

The experience at Ford Motor on 80B20 in passenger car pinions and gears and truck ring and side gears has not been too good. At Ford, the 80B20 grade in sections from 1½ to 1¾ in. didn't always meet the required surface hardness. On lighter ring gears there was too much warpage and the steel had too much hardenability. Some of the dynamometer tests failed after 30 hr at 8 pct of full engine torque. Eaton Axle in Cleveland has also had trouble obtaining high enough hardness on carburized 80B20 side pinions and gears. It is believed that the two new 80B00 grades, 80B15 and 80B17 with lower carbon and higher manganese, see Table I, Part I, will help curb the distortion and will certainly decrease the hardenability.

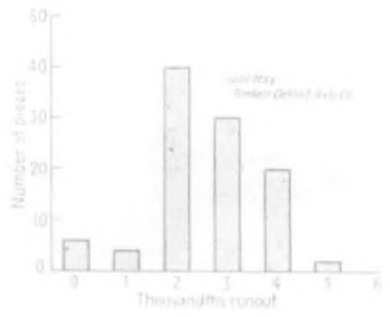


FIG. 15—Longitudinal runout measured on 100 pinions of 94B20 steel in as quenched condition.

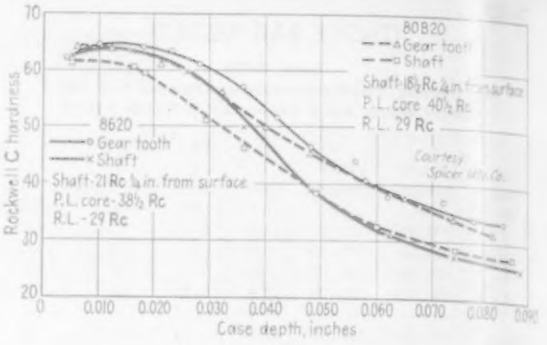


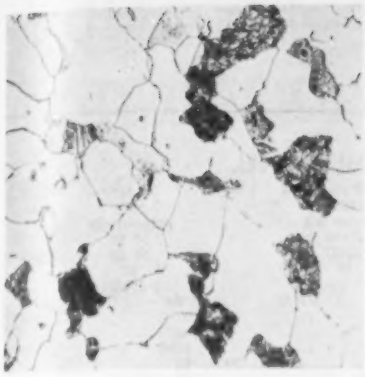
FIG. 16—Hardness gradients across carburized and heat treated countershafts made from both 80B20 and 8620 steel. These shafts were treated on a reheat cycle, pitch line and root line hardnesses are shown.

At R. G. Le Tourneau Inc., Peoria, the distortion problem in 43B17 gears, formerly made of 4820, was cured by changing the ratios in mass of the gear. A cross section drawing is shown in Fig. 18. The slip ring shown in Fig. 18 helped cure the distortion on reheats but the practice on this part was later changed to Gleason Fixture practice and quenched direct. Before the slip ring was used, the parts were shrinking and tapering at the splined base, the gear teeth were shrinking on the outside ends and the counterbore was shrinking on the top sides. Even in the Gleason fixture, shrinkage of the bore was still encountered. The bore plug of the quenching fixture was made larger to hold bore size and these gears are now being produced with negligible distortion.

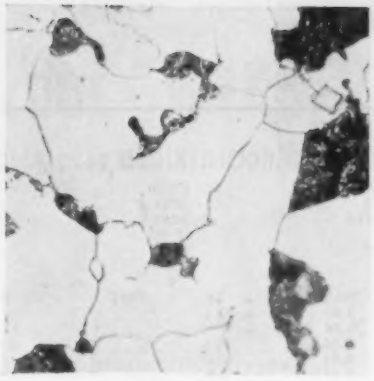
Carburizing pot redesigned

Another modification in practice made at Le Tourneau which has helped cure distortion is a new carburizing pot design. A pipe is now used in the center of the pot which supplies heat to the bore of the gear shown in Fig. 18 at a rate uniform to the heating rate of the outside diameter of the part. On this particular gear, it is mandatory to hold the dimension of the bore and the spline of the heat treated part as close as possible to print size, ±0.002 in., as a 5000-lb press fit is required on the pinion shaft.

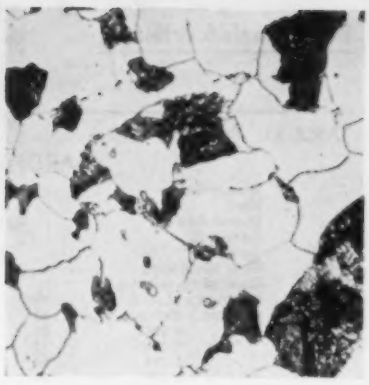
Spicer reported good results on the 80B20 grade getting less distortion on their pinions than they usually get with 4620. On gears the bores closed in more and the teeth flattened out more than usual but these factors are not giving them trouble. Martempered 80B20 gears show



8620—Bhn 143



80B20—Bhn 131



94B20—Bhn 137

FIG. 17—Microstructures of typical heats after continuous cycle annealing. The 8620 had a 6-7 grain size while both boron steels showed 4-6 ferrite grain size. 500X Courtesy Spicer Mfg. Div., Dana Corp.

TABLE X

HARDNESS OF 8620 and 80B20 STEEL

Steel Grade	8620	80B20	8620	80B20
Furnace type	Continuous gas carburized		Pit carburized	
Heat treatment	Carburized at 1700° F Cool to 1100° F Reheat to 1550° F Oil quench Drawn at 340° F		Carburized at 1700° F Cool to 1550° F Oil quench Drawn at 340° F	
File hardness on shaft	0–0.0002 in.	0.0032 in.	0–0.0002 in.	0–0.0002 in.
Hardness P. L.	File hard	File hard	File hard	File hard
Surface Rc	62–62.5	59.5–59.5	60.5–61	61–61.5
Rc ¼ in. below surface of shaft	21	18.5	18	18
Rc tooth core at pitch line	38.5	40.5	29	37
Rc tooth core at root line	29	29	22	28

	C	Mn	Ni	Cr	Mo	Si	B
8620	0.18	0.71	0.45	0.45	0.15	0.24	.....
80B20	0.21	0.53	0.35	0.28	0.10	0.28	0.001

Carburized simultaneously with regular production parts to 0.040–0.050 in. ase depth with furnace cycles indicated.

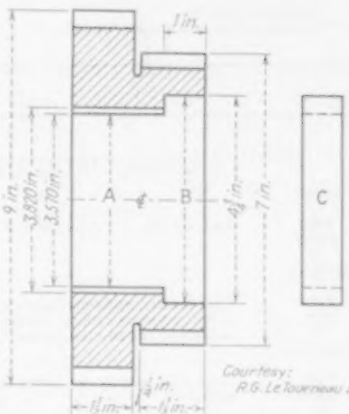


FIG. 18—This helical cluster gear is really two gears in one with a splined base (A), a counterbore (B) on the small gear side. The ring (C) slips into the counterbore to help the part heat more evenly.

TABLE XI

HARDNESS OF CARBURIZED 8620 and 80B20 STEEL

Sample No.	F-950	F-951	F-952	F-961	F-962	F-963
Steel	8620	80B20	8620	80B20	8620	80B20
Quench Temp. °F	1650	1650	1600	1600	1550	1550
Surface Rc	57	59	56–57	60.5	57–57.5	60.5–61.5
Surface Rc*	55–56	60	55	59	54–55	59–60
File hardness	Touch in spots	Touch	OK	Light skin	OK	Touch

Hardness and pct C Gradient	Rc**	Pct C	Rc	Pct C	Rc	Pct C	Rc	Pct C	Rc	Pct C	Rc	Pct C
Surface	57	.....	59	.....	56	1.30	59	1.26	57	.....	60½	.....
0.005	58½	.....	60	.....	58	1.22	60½	1.19	58	.....	61½	.....
0.010	60	.....	61¼	.....	60	1.14	62	1.11	60	.....	62½	.....
0.015	61	.....	62¼	.....	62	1.05	63½	1.03	61½	.....	64	.....
0.020	62½	.....	63¼	.....	63½	0.97	65	0.95	63	.....	65½	.....
0.025	64	.....	63¼	.....	64	0.89	65½	0.88	64½	.....	66	.....
0.030	64½	.....	63¼	.....	64	0.80	65¼	0.80	65	.....	66	.....
0.035	64½	.....	62½	.....	63½	0.72	64½	0.72	65	.....	65½	.....
0.040	63	.....	61	.....	62	0.63	63	0.64	64¼	.....	65	.....
0.045	61½	.....	59	.....	60	0.55	61	0.56	62½	.....	63	.....
0.050	59	.....	56	.....	57¼	0.47	58	0.48	60	.....	61	.....
0.055	55½	.....	53	.....	54¼	0.38	55	0.40	57	.....	57½	.....
0.060	52	.....	50	.....	52¼	0.30	51	0.33	53	.....	54	.....
0.25 in.	31	.....	31	.....	33½	.....	30	.....	30	.....	28	.....

Analysis:	C	Mn	Ni	Cr	Mo	Si	B	Grain Size
8620	0.22	0.70	0.40	0.50	0.15	0.25		
80B20	0.19	0.62	0.32	0.30	0.13	0.29	0.001	4–6

* Converted from Ra.
** Converted from 5 kg Vickers Readings
Courtesy Spicer Mfg.

TABLE XII

HARDNESS OF CARBONITRIDED 8620 AND 94B20 STEEL

Sample No.	F 964		F 965		F 966		F 967	
Steel	94B20		8620		94B20		8620	
Quench medium	Agitated oil		Agitated oil		Agitated salt		Agitated salt	
Surface Rc	60		57-58		57-59		57-58	
Surface Rc*	57-58		54-55		55-57		55-56	
Rc at Micro loca.	60		57		59		58	
Depth of file soft s'kin	0		0		0.001		0-0.0001	
Hardness and pct C	Rc**	Pct C	Rc	Pct C	Rc	Pct C	Rc	Pct C
Gradient. Surface	58	1.06	55½	....	59	....	57½	....
0.005	60	1.04	57	....	62	....	60	....
0.010	62	0.99	58½	....	63½	....	62½	....
0.015	64	0.91	60	....	63½	....	65	....
0.020	64½	0.81	61½	....	61½	....	66	....
0.025	64½	0.68	62	....	58½	....	65½	....
0.030	62½	0.55	61	....	52½	....	62½	....
0.035	60	0.43	60	....	41	....	58	....
0.040	56½	0.34	58	....	33½	....	50	....
0.045	51½	0.29	55	....	29½	....	43	....
0.050	47½	0.25	52	....	29	....	38	....
0.055	44	0.23	49	....	28½	....	35	....
0.060	42	0.22	46½	....	28½	....	32½	....
0.25 in. from surface	26	....	33	....	18	....	28	....

Chemical analysis:	C	Mn	Ni	Cr	Mo	Si	B	Grain Size
8620	0.19	0.78	0.77	0.60	0.19	0.25	....	6-7
94B20	0.20	0.71	0.40	0.36	0.11	0.25	0.001	4-6

* Converted from Ra.
** Converted from 5 kg Vickers Readings.

Courtesy Spicer Mfg.

TABLE XIII

MICROSTRUCTURE OF CARBONITRIDED 8620 and 94B20

Sample	CASE			CORE
	Carbides	Martensite	Austenite	
F964 94B20 Oil quenched	Few, fine size, uniformly distributed	Medium and coarse	10 pct	Blocked out ferrite. Structure that was originally in solution is now upper and lower bainite.
F965 8620 Oil quenched	Few, fine size, uniformly distributed at the immediate surface. Medium and large size below the surface	Medium and coarse	10 to 20 pct	Fine ferrite and medium grain, structure is upper and lower bainite.
F966 94B20 Salt quenched	Large size mostly on immediate surface	Medium and coarse	10 to 20 pct	Coarse ferrite (very poor structure) approx. 20 pct bainite is present.
F967 8620 Salt quenched	Medium and coarse in scattered patches at and slightly beneath surface	Medium and coarse	10 to 20 pct	30 pct ferrite, balance upper and lower bainite.

twice as good fatigue life than the old 4317 or 8620 gears, Spicer reports.

At Saginaw Steering Gear Div., General Motors Corp., the 80B20 water-quenched has proved satisfactory in drive worms. Good wear tests and hardness were obtained. However, the 94B20 has not shown as good fatigue life as 9420 on these same parts at Saginaw. The 94B20 had five points higher Rc in the case than the 9420.

Part IV, to appear in next week's issue, will present experiences to date on the 50BXX series now in production by Wisconsin Steel Div. of International Harvester Co.

PAST IRON AGE ARTICLES ON BORON STEEL

"Special Addition-Agent Steels," by R. B. Schenck, October 16, 1943, p. 88.
"Boron Steels Increasingly Favored," N. F. Tisdale, February 4, 1943, p. 40.
"Boron—How to Find It, What It Does." February 25, 1943, p. 56.
"Effect of Boron Containing Additions on NE Steels," by A. S. Jameson, March 25, 1943, p. 45.
"Comparative Effects of Boron and Manganese on Some Properties of Heat-Treated Steels," by G. F. Comstock, September 9, 1943, p. 48.
"Boron in NE 9440 and SAE 4640 Steel," by G. F. Comstock, July 13, 1944, p. 48.
"Intensifying of NE 9422 Steel," August 19, 1943, p. 50.
"Ordnance Dept. Sets Methods for Needled Steel Specifications," November 18, 1943, p. 67, 168.
"Effect of Boron on Machinability and Hardenability," Feb. 15, 1945, p. 52, by T. G. Harvey.
"Production Use of Boron Steel," by F. J. Robbins and J. J. Lawless, June 23, 1949, p. 82.

Home-made
TORQUE CONTROL
cuts tool breakage

By J. R. Wescott, Jr.
Assistant Plant Manager
Kaiser-Frazer, Detroit Engine Div.
Willow Run, Mich.

Here's how Kaiser-Frazer built its own electronic torque control device from $20 worth of components. On a deep hole drilling job, it cut drill breakage from 15 per day to zero.

Excessive perishable tool cost due to breakage on machine tools at Kaiser-Frazer's engine division indicated the need for an inexpensive automatic device to minimize this breakage. Experience of several years with one type of electronic torque control has indicated that appreciable reduction in perishable tool costs can be realized by a limited application of this type of protection.

With expense as a factor in the selection of a device, it was felt that simplicity was to be desired over a high degree of refinement. Hence, the decision was made to use a single variable, motor current, as the control medium.

Controls by reversing feed

The use of motor current as an indicator of loading conditions on the tool requires some justification. Limiting the discussion to 3-phase, squirrel-cage induction motors, the simplest case is that in which a motor drives a single tool. Forces on the tool are reflected as torque on the motor shaft. It is desirable to limit this torque to a value sufficient to do a normal job but short of that required to break the tool. This could be accomplished by continously controlling feed rate so as to limit the torque variation to a small value, or by removing the tool load at a present torque limit by stopping or reversing the feed. The former method is the more elaborate of the two and would require a review of production time standards on any machine so controlled because the time required for the completion of successive cycles would be a variable. For these reasons the latter method was selected.

When an induction motor is operated in its stable speed range, that is, at slips smaller than pull-out slip, the motor current is a single-valued, increasing function of resisting torque at constant line voltage. Fig. 1 represents a typical torque-current curve, at constant voltage, for a 10-hp, 220-v squirrel-cage induction motor. The slope of the curve at rated output is approximately 1.1 amp per ft-lb of total resisting torque. A device which could detect an increment of 1 amp line current on this motor running at rated output would have a sensitivity of 1 ft-lb.

Total resisting torque is comprised of useful output torque plus torque due to friction and windage. The windage torque characteristic remains essentially unchanged with time. Friction torque can be expected to vary slowly with time due to bearing wear or poor lubrication. The only rapidly changing condition which can be expected to affect motor current, under normal conditions, is output torque. Deviation from normal conditions is caused by single-phasing or voltage regulation on the line at the machine.

The torque control device which has been employed for several years at Kaiser-Frazer engine division is of shop-made origin, although commercial devices of varying design are available for this purpose. Fig. 2 illustrates a typical unit in schematic form. The type 502-A thyraton is normally cut off by a negative bias furnished by a selenium rectifier and RC circuit composed of a 30 mf electrolytic capacitor and a 1 megohm potentiometer. A voltage, proportional to line current, is amplified through a 35:1 output transformer using the low side as input. The voltage appearing on the grid of the 502-A is the sum of the bias and signal voltages. As the motor current increases, the grid voltage reaches an instantaneous value sufficient to permit tube conduction. The capacitor in shunt with the relay coil prevents chattering. The relay points are utilized in the machine tool control circuit to provide emergency return or feed-halt as desired.

Plate voltage is normally taken from two of the three phases available at the motor ter-

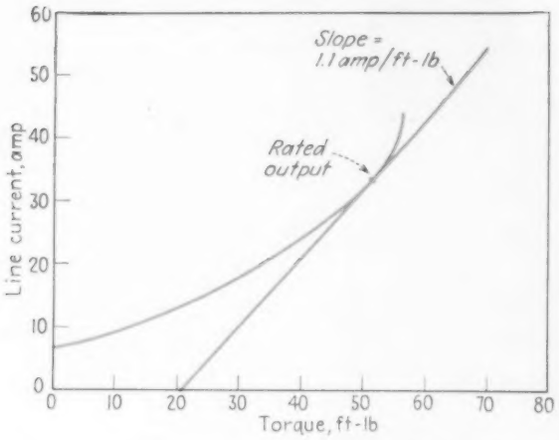


FIG. 1—Torque-current curve for a typical 10-hp, 220-v squirrel-cage motor. Slope, at rated output, of about 1.1 amp per ft-lb means that a device sensitive to 1 amp difference in motor current would detect 1 ft-lb of torque.

line current. The cost of the components for a complete torque control unit of this type is approximately $20.

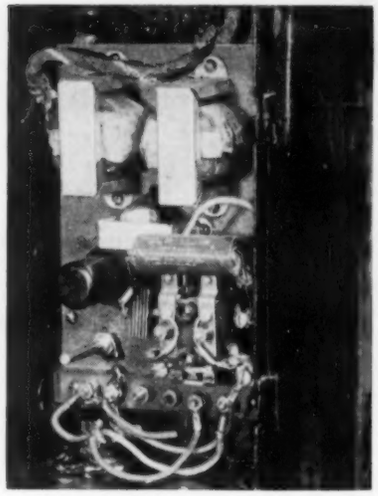


FIG. 3 — Kaiser-Frazer's homemade electronic torque control device as installed on a single-spindle drill.

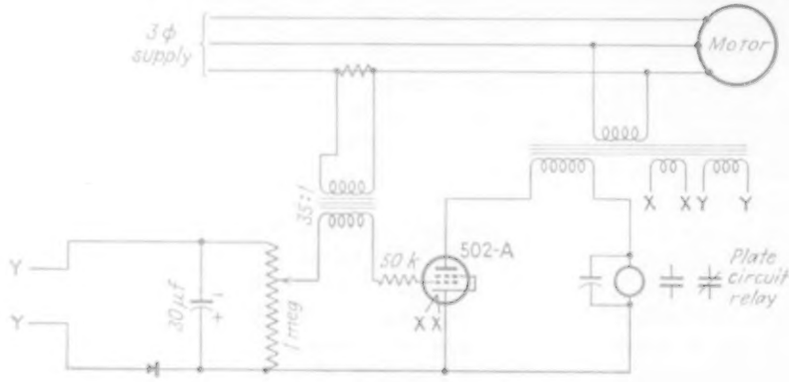


FIG. 2—Schematic diagram of a typical torque control unit of the type Kaiser-Frazer built in its own shops.

minals after suitable transformation. The choice of phases from which to take plate supply is not arbitrary but depends on the phase from which the current measurement is being taken.

The tube will conduct only during positive half-cycles of plate voltage provided that the instantaneous grid voltage exceeds the critical firing characteristic of the tube. Various plate-grid voltage relationships would permit conduction for different portions of a cycle, or no conduction. Approximate in-phase voltage-current pairs can be selected with an oscilloscope using a Lissajou pattern or superposition of the two signals on the viewing screen by means of an electronic switch. An exactly inphase relationship will normally not be attainable, but is not necessary since the tube will conduct satisfactorily over a range of phase relationships in the vicinity of the inphase condition.

The selection of the value of dropping resistor in the motor line and dc bias requirements depend on the allowable torque variation on the job and should be tailored for each range of applications. The device has been satisfactorily applied utilizing a 4-v peak signal increase corresponding to a 10 pct increase in

The resisting torque on many machining jobs drifts upwards as cutting edges become progressively duller; hence, the torque control will function as an indicator for tool change or cutter grind scheduling. In this application, signal lights could replace the machine control circuit.

The value of the device as an indicator or protective agent decreases with the number of spindles or cutters operating from a single motor. This follows from the fact that, as a number of cutters increases, the proportional contribution of each to the total torque diminishes. In the case of multiple-spindle milling, machines, drills, taps, etc., the value of the device as here described is questionable. When the application was a single-spindle reciprocating, deep-hole drill, however, drill breakage was reduced from 15 per day to zero.

It is the writer's belief that a torque-control of the current measuring type may be applied profitably to machine tools in which the number of spindles per motor does not exceed two, and preferably one. For successful control of larger numbers of spindles on a single motor, a greater refinement in instrumentation is indicated.

TIPS on welding high-temperature materials

By F. H. Stevenson
Production Engineer
Aerojet Engineering Corp.
Azusa, Calif.

In production of military rockets, Aerojet Engineering has learned a lot about the brazing and welding of titanium, stainless steels, and the special high-temperature superalloys. Here are some tips based on Aerojet's experience.

Brazing and welding play important roles in the fabrication of rockets, which are becoming important in military applications and also have considerable potential peacetime value. Only by the use of welding can some of the intricate parts used in rockets be fabricated.

In the course of manufacture of rockets, a wide variety of welding and brazing processes and techniques are applied to a wide variety of materials. Both materials and techniques include both the common and the relatively unusual.

Among the many different materials employed in fabricating rocket parts, such materials as stainless steels of the AISI 300 series and nickel alloys represent the largest tonnages. Carbon steels also are among these materials, mainly SAE 4130 and SAE 1025. For special service, superalloys such as Hastelloy A, B, and C, Haynes Stellite No. 25, titanium and 17-7 PH are used.

Brazing techniques employed in the production of precision parts include induction, furnace, dip and torch. The welding processes include all of the commercially applied fusion and resistance techniques. Fusion welding processes used are oxyacetylene, metal arc, atomic-hydrogen, inert-gas-shielded arc and submerged-arc. Resistance welding processes are spot, seam, projection and flash butt-welding. Aerojet Engineering Corp. tries always to use the process which is the most practical from the standpoint of the ease with which fabrication can be obtained in the shop, and the cost of the finished part.

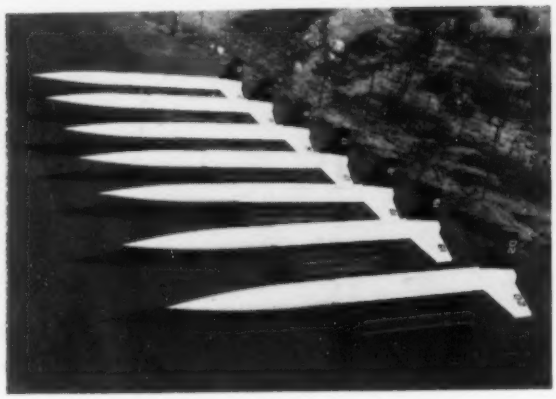
The problem of welding is complicated by the fact that most of the common high temperature materials have high coefficient of thermal expansion. For example, the coefficient of thermal expansion of stainless steel is approximately 50 pct greater than that of mild steel.

Nearly all of the alloys can be brazed, using silver, copper and gold, except titanium. At the present time titanium cannot be brazed successfully for production, though it has been brazed in the laboratory.

Induction brazing used

Induction heating is the most widely used brazing process for making precision parts. The advantages of this process, where it can be used, are the speed, and the elimination of distortion because of the rapid heating time. These make it possible to produce parts of better quality at less cost.

Resistance welding, as is well known, can be applied to the majority of the materials used in rockets. As regards fusion welding, probably the most widely used process for these alloys is the inert-gas-shielded arc. This process has been in use for the past 8 years and has replaced, to a great extent, the oxyacetylene and



FINISHED ROCKETS awaiting shipment.

metal arc processes in the welding of the thinner sections of these alloys. In the Aerojet shop, 95 pct of welding is done using the inert-gas-shielded arc process, which is adapted easily to machine welding.

A copper back-up bar is used with suitable clamps to hold the parts in alignment and tight against the bar. Aerojet uses a groove, in the bar, ¼ in. wide by 0.015 in. deep. This is quite satisfactory for the welding of material 0.032 to 0.078 in. thick. However, the shape of the groove depends a great deal on the material being welded, and if filler material is added.

If the material is thinner than 0.032 in., a groove is not recommended. This applies to a straight buttweld without the addition of a filler material. The spacing of the hold-down clamps should be as small as possible—for example, the space between the hold-down clamps for 0.032 in. material is 5/16 in. As a general rule a gas back-up is not needed because enough gas is forced between the seam during the welding operation.

At Aerojet argon is used as a shielding gas. However, it appears that the use of helium in machine welding is desirable because of the fact that higher speeds may be obtained with the same ampere setting. For manual welding argon is preferable because it seems easier for the operator to handle.

Direct current preferred

The question of ac versus dc for the welding of these alloys always seems to creep into the picture. It has been the author's experience that dc is the best to use because narrow heat-affected zones and deeper penetration is possible. Of course ac is used on all aluminum and magnesium alloys, although recent work in the East has indicated that dc with helium is satisfactory for aluminum.

Aerojet has made some experiments on welding of aluminum using dc straight polarity with Hi-Thoria tungsten electrodes and have obtained very good results. It appears that dc welding of aluminum is going to have a place in production.

In machine welding the dc is started by the use of a superimposed high-frequency ac current which can be cut off as soon as the arc is started. In a number of Aerojet machine-welded assemblies it is necessary to use a gas back-up. Usually the amount of gas passed through is between 8 to 10 litres per min. By using a gas back-up, oxidation is prevented and a clean undersurface results.

Penetration, when experienced, is smooth and has the appearance of a weld bead. A gas back-up can be either inert-gas such as helium, argon or hydrogen. Hydrogen is used because it is cheaper. Some companies use flux as a back-up but this presents the problem of cleaning after welding. Aerojet finds that a gas back-up is much superior to flux for its particular applications.

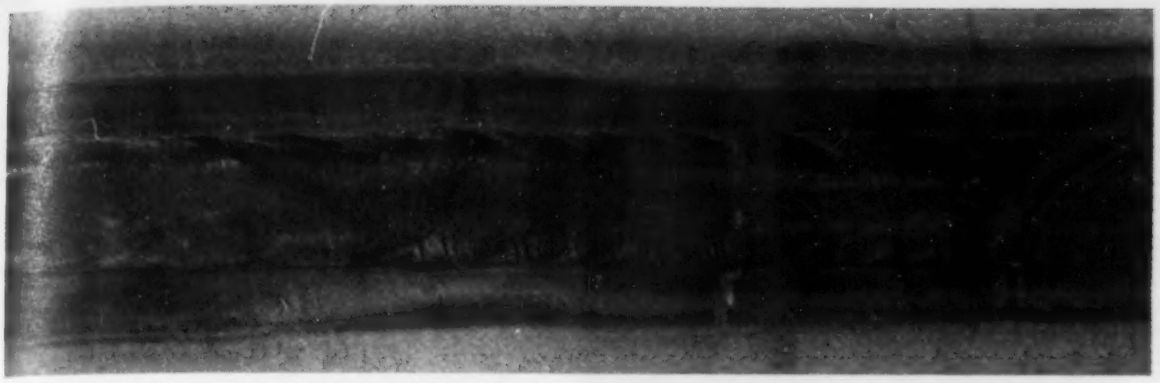
Titanium forms like 302 stainless

Titanium is a material of great importance in rocket manufacture. In forming titanium sheet a slow strain rate is desirable because it permits greater plastic deformation without rupture. The forming characteristics of commercially pure titanium sheet are about the same as those of ¼ hard Type 302 or 304 stainless sheet. Where difficult stretch forming in encountered at ambient temperature, a blank temperature of 600°F will correct the situation and allow much greater deformation without rupture. When interstage annealing is required this should be conducted at 1300°F in an air atmosphere furnace.

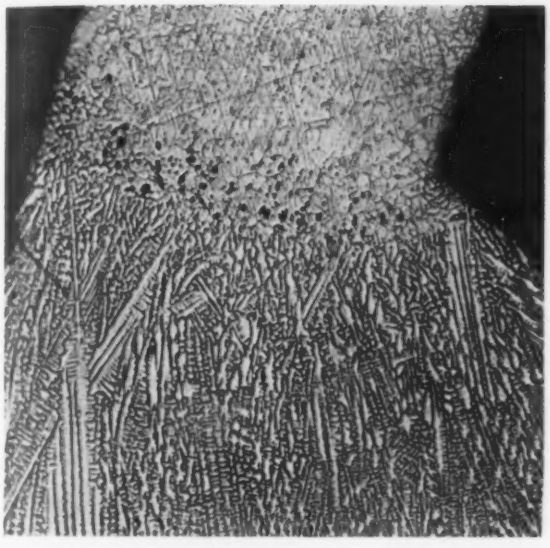
There is evidence of embrittlement of the parent metal on either side of a weld when joining titanium sheet without the use of a suitable back-up bar which reduces the width of the heat-affected zone. This can be eliminated by extra shielding of the weld area. This shielding must be carried out on both sides of the weld area and should continue until the metal has cooled to approximately 900°F. If this is not done atmospheric gas pickup may occur with subsequent cracking a possibility.

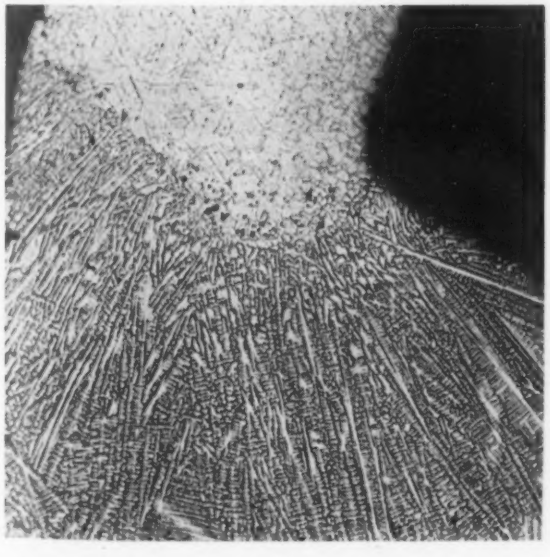
The ductility of the weld is impaired when the carbon is above the range of about 0.25 pct. However, if the average carbon range is 0.10 to 0.15 pct, it apparently does not affect the ductility of the weld. Except for the above, titanium can be readily welded by the inert-gas-shielded arc process.

The welding of Haynes No. 25 alloy is quite similar to type 347 stainless steel, but evidently it shrinks about 25 pct more than type 347 stainless steel. The weld zone and heat-affected zone must be kept as small as possible; otherwise small surface cracks will appear. Also it is very important that any part that has been annealed or otherwise heated and has scaled should be cleaned before any welding is attempted.



TYPE 347 stainless, (above) machine welded by the inert-gas-shielded arc process, shown from torch side. Weld made at torch speed of 25 ipm, 125 amp, dc straight polarity. This weld sheet was later spun to shape without any grinding of the weld, and no filler material was added.





TYPE 347 stainless inert-gas-shielded arc welded, with copper back-up plate and no flux. Top weld was made at comparatively low rate of travel, and considerable carbide precipitation took place. Same weld except for higher rate of travel, bottom, shows much less carbide precipitation.

Recently other materials such as Armco 17-7 PH and 304 extra-low carbon have been coming to the front. Both of these materials can be welded very easily by inert-arc. 17-7 PH, however, must be welded as rapidly as possible and should be backed-up and clamped so that a very narrow heat affected zone is obtained. Also, it must be well shielded at all times while being welded.

Experience in designing jigs for fusion welding of rocket parts indicates several important points to be considered. In considering shrinkage allowances, for example, it must be remembered that torch-welded parts shrink more than arcwelded parts. And stainless steel and aluminum have greater thermal expansion and contraction than low-carbon steel.

Downhand welding preferred

Wherever possible jigs should be designed so downhand welding can be done. And maximum visibility for the welder should be provided. Jigs must be rigid enough to support the part without excessive deflection, but also have sufficient flexibility to permit normal shrinkage.

The jig must carry away part of the welding heat to prevent too much heat flow into the welded assembly. Protective pads should be provided to prevent marring of the surface when welding aluminum or stainless steel. The jig should permit easy placement of parts, and easy removal of the welded assembly. Screw clamps should be avoided, in favor of quick-acting clamps, wherever possible.

COOLANT FLOOD
improves carbide performance

By Wackch Iwascheff
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Tests made during turning of 40,000 shell forgings with automatic lathes prove the value of an enveloping flood of coolant in improving carbide tool performance. Surface speed was increased, surface finish improved, and tool life increased as much as ten times.

It is generally recognized that correct application of coolants to high-speed steel tools permits higher cutting speeds and better rates of production. Although it would seem that similar benefits could be anticipated for carbide tools, employment of coolants has in many quarters been considered both inconvenient and unnecessary. However, the tests reported herein show conclusively that great improvements in production can be obtained when a copious flow of emulsion is supplied to carbide tools.

Several factors affect performance

Several factors must be considered in efforts to increase the production of a machine tool. Machine power and rigidity may have to be increased to accommodate an increased rate of metal removal. Tool angles should be adapted to the material to be machined. Usually a narrow ridge at the cutting edge will prevent or minimize the formation of a built-up edge and will improve tool life. Appropriate chip breakers may have to be provided. These factors are usually carefully considered.

Coolant application neglected

But selection of coolant type, rate of flow, and pressure has generally been left in the hands of shop men. Although the term efficient coolant has not been adequately defined and the problems involving the selection of coolant pressure and the overcoming of disadvantages or inconveniences have not been completely analyzed, it is certain that a plentiful supply of coolant is essential.

Actual test results illustrating the effect of coolant rate of flow on tool life of high-speed steel tools for several chip cross-sections and cutting speeds when machining medium carbon steels are shown in Fig. 5, p. 114.

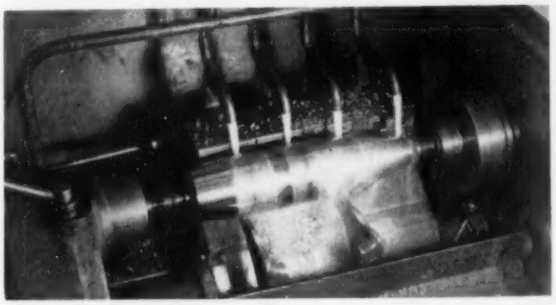


FIG. 1—Spray arrangement for coolant delivery during turning of shell forgings. Fay automatic lathe is equipped with four carbide tools. Note coolant clinging to workpiece.

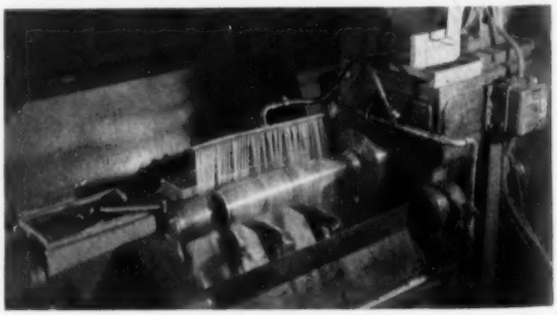


FIG. 2—Arrangement for delivery of coolant to each of four tools on Fay automatic lathe by means of individual nozzles.

ilar relation exists for carbide tools. As can be seen in the graphs, the optimum coolant rate of flow was approximately 8 gal per min with negligible improvement shown for greater rates of flow. Whether the coolant was supplied at greater pressures or in greater volume did not seem to matter.

Results of a large series of shop tests are much more convincing to production men than laboratory tests, since the attitude of the machine operator is taken into consideration. The author conducted shop tests with five Fay automatic lathes having 37½-hp drives.[1] A steel-cutting grade of carbide brazed steel tool shanks was used to machine 40,000 shell forgings of 0.60 pct C steel 6 in. diam and 20 in. long, with each machine finishing 8000 pieces. With little effort the objection to coolant spray was eliminated.

[1] *Nassdrehen mit Hartmetall-Schneidplatten, Werkstatt u. Betrieb, vol. 81, No. 9, 1949, p. 252.*

TEST CONDITIONS

True rake angle, deg.	4
Relief angle, deg.	5
Side cutting edge angle, deg.	15
Ridge (primary rake) width, in.	0.008
Cutting speed, fpm	300
Feed per rev, in.	0.030
Depth of cut, max, in.	5/16
Coolant, oil-water emulsion ratio	1:100
Coolant temperature range, °F	77 to 81
Tensile strength of forgings, lb per sq in.	100,000 to 114,000

TOOL LIFE COMPARISON

Coolant jet through ¾ in. diam pipes	450 workpieces
Coolant jet through ⅜ in. diam pipes	325 workpieces
Coolant spray	430 workpieces
Dry turning	190 workpieces

Various cooling arrangements were tried. Small holes, 5/64 to ⅛ in. diam, were spaced at intervals of 13/32 to ½ in. along ½-in. diam pipe for one trial. Coolant was supplied at the center of the pipe which was rigidly fastened to the lathe. For each of the four tools 1.3 gpm was provided. In another series of tests, each tool was supplied with coolant at the rate of 4 gpm through separate ⅜-in. diam pipes.

Tools were kept in operation until regrinding became necessary. Average tool life per tip under the various cooling arrangements is given in the table immediately above.

Although the pressure was not measured it was adjusted in a manner such that the coolant not only flooded the tool point and workpiece, but formed an enveloping sheet of liquid over the workpiece. Cooling action improved with an increase in the thickness and uniformity of this liquid sheet. Maintenance of an adequate liquid sheet must be established by checking the coolant supply. A valve was adjusted until the coolant clung to the workpiece; tight clinging indicating that the pressure and quantity of coolant were correct.

FIG. 3—Carbide cutting tip, photographed from two angles, after machining 155 workpieces without coolant.

Proper adjustment depends on the speed in rpm and the workpiece diameter. The coolant will begin to spray when the speed is too high. Because centrifugal force is great in comparison to the adhesive force, it is impossible to maintain a film of coolant on the side of the workpiece opposite the tools. To achieve complete envelopment of the workpiece in coolant special equipment would be necessary or the workpiece would have to be machined while completely submerged in coolant.

The beneficial results obtained with the use of coolant can be appreciated by a comparison of the accompanying tool tip photographs. In dry turning the cutting edge changed rapidly through cratering or chipping or both. Craters reached a depth of 0.040 in. Because of the necessity of keeping the tool at the same level and to eliminate extensive regrinding, tools were changed before cratering had proceeded to too great an extent. None of the tools had a chip-breaker.

The tool wear was only 0.020 in. after 782 pieces machined with coolant in comparison to the much greater wear after 65 and 155 pieces were turned without coolant. When turning with coolant, no real cratering took place, though a hot spot appeared on the tool. Small cracks which later became fractures developed

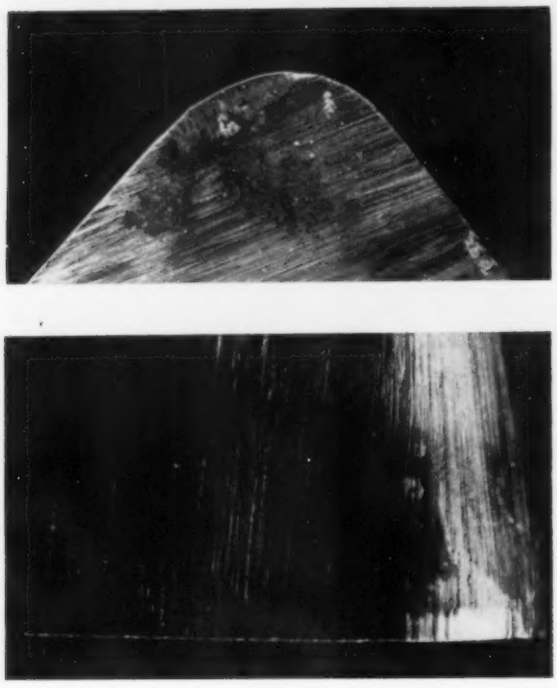


FIG. 4—Carbide cutting tip, photographed from two angles, after machining 782 workpieces with coolant.

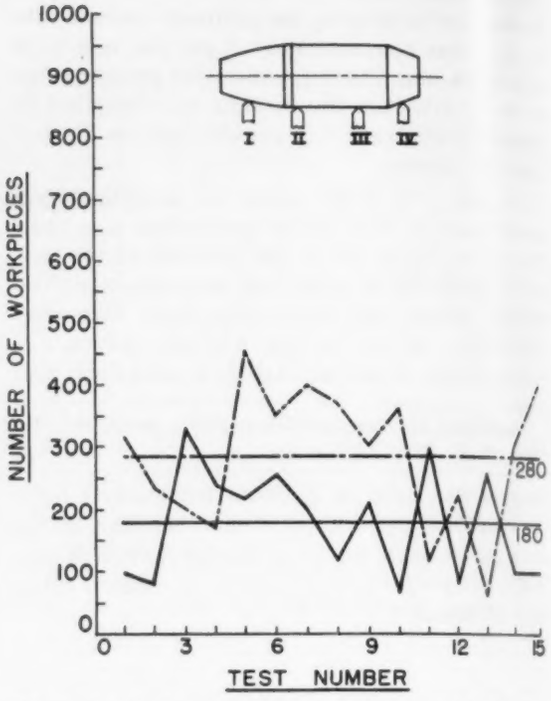


FIG. 5—Result of tests made on shell forgings with (broken line) and without (solid line) coolant. Tool life is expressed as number of workpieces machined before regrinding was necessary. Results are for Tool No. II, or second finishing cut.

in the carbide tip when turning without coolant but were not observed when turning with coolant.

Comparative wear resistance can be ascertained from the number of tool adjustments necessitated by tool wear during each working shift. Tools had to be adjusted 10 to 20 times per shift when turning dry and only 2 to 4 times per shift when turning with coolant.

In turning the 40,000 forgings with proper use of coolant, cutting speed was increased from 215 to 300 sfpm, while tool life was extended as much as ten times. This naturally reduced the time required for tool adjustments and regrinding, and meant that carbide was more economically used. The built-up ridge at the cutting edge of the tool was either eliminated or at least decreased.

Use of an oil emulsion meant no special lubrication for machine ways was necessary, and no rusting of ways took place. Surface finish of the workpiece was improved. Short chips were produced, without the use of chipbreakers.

The net result was improvement in quality while lowering production costs.

New Books

"Plant Layout," by R. W. Mallick and A. T. Gaudreau, is a practical book to help you arrive at the best layout and materials handling system for your plant. Combining conservation of space, profitable use of plant services, and a scientific analysis of materials handling, the subject is developed into a practical engineering science. The book contains complete techniques for laying out an entire plant, and provides a sound basis for the executive to decide for himself when plant and equipment appropriations are justifiable. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $7.50. 391 p.

"The Behavior of Engineering Metals," by H. W. Gillett, presents the view of the metallurgist to those who have not specialized in this field. The book introduces the basic concepts of metallurgy, and examples show how they are used. It deals with the behavior of each of the principal commercial metals and alloys, and covers special considerations that may influence the selection of metals and alloys. These include such topics as machinability, special fabricating techniques, corrosion, wear and high temperature. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $6.50. 396 p.

news of industry

ENGINEERS—Planning Needed for Future Supply

Engineer is man of the year in classified ads . . . Industry must save present staff and sow seeds for future . . . Some firms in defense work can outbid others—*By Ted Metaxas.*

The engineer has again become the most popular man in the classified ad section. He is getting more newspaper space than pinups. Firms are trying to win his services with more money, bigger desks, more elegant titles, and other gimmicks. Unfilled demand for engineers this year have been pessimistically estimated at approximately 60,000.

Industry's harvest of graduates this year is set at about 38,000. But judging from school enrollments the number will be only 26,000 in 1952 when demand will climax. After that a progressive tapering off is indicated. Since American industry is reaching king-size proportions, the shortage of engineers is seen as long-term in nature.

Sowing the Seeds — Management is thus confronted with the double-barreled task of keeping present staffs intact and still sowing the seeds for a plentiful later supply from engineering schools. The country needs more engineering freshmen as future mainstays of productivity.

Since engineers themselves are front-line propagandists either for or against a career in that field, management must take stock of the engineer's plight in industry and enlist him firmly on its side. This calls for a lesson in the care and contentment of engineers.

Intelligent and highly skilled, the engineer has long insisted that he was a crucial cog in production and a professional man in the pure sense of the word. But sometimes he snarled to himself that he was neither recognized as a professional by a layman management nor sufficiently rewarded. He has seen too many blue-collar men paying more income tax than he.

Rugged Individualist—The engineer is often too steeped in the love of technology to be an active climber in management—but he has noted the discrepancy between his salary and that of less-skilled go-getters. He is too proud to restrict himself to union discipline and he claims he should not have to do so. Management should take him into fuller partnership.

The traffic of engineers to do better jobs is increasing. One engineering firm told THE IRON AGE that classified ads are its strongest pulling medium. The practice of scouting colleges has been intensified and sights on scholastic standings have been dropped.

Department heads also slip job opportunity information into the engineers' grapevine. Friends tell friends. Out-and-out labor pirating is avoided as unethical. An engineer from another firm must make the first overture, but once he does the bidding begins. Great strides in advancement are now possible for the engineer and it is to his credit that job-changing is not twice what it is. He wants more than a temporary defense job.

Some firms more solidly in defense work are in a better position to offer more money and, just as important, more overtime and benefits. Sometimes moving allowances are given. Company prestige is played to the hilt and the glamor of designing for defense is thrown in.

Tops in Demand—Smaller firms not too deeply into defense are being bled. In one case reported to THE IRON AGE, a firm lost a few engineers it had carried through leaner years. Electronics engineers are the center of a storm of demand. One personnel manager estimated that these grads get on an average five to six job offers — sometimes at salaries higher than experienced engineers earned in quieter times. Mechanical engineers are also on the most-wanted list. Average starting salaries run about $75 per week.

Some engineers are cynical about the sudden rush for their talents. They know the crest of

Leaner Nickel Alloy

To make available nickel supplies go further, International Nickel Co. has developed a new alloy for use in high-temperature conditions, particularly in corrosive atmospheres. "Incoloy" contains about 35 pct nickel, 20 pct chromium, balance iron.

The new alloy is obtainable in most standard mill forms, including sheet, strip, rod, wire and tubing. The new material is expected to prove suitable for many applications formerly using alloys with a higher nickel content, such as Inconel (70 pct nickel.)

the boom wave always flattens. It's management's job to convince them that expanded industry will continue to furnish a secure market for engineers.

It can be said that in early 1950 some engineering grads had to hunt for work, had to relocate to get any sort of a job. In 1949 the engineer grad surplus was 14,000. But a surplus year does not mean that these men did not eventually find work. They were just more slowly absorbed.

SCRAP—Record Expansion for Steel's Needs

Yards committed to spend $8.2 million . . . May rise to $15 million . . . New facilities encouraged by fast tax write-offs . . . Mechanization of yards is speeded—*By John Delaney.*

The scrap iron and steel industry is committed to spend approximately $8.2 million for expansion and new facilities. This figure may eventually reach $15 million. This is more than was spent during World War II and will place the industry in a good position to handle increased scrap requirements of the steel producers.

The availability of fast tax write-offs has been an important factor in the expansion program. Thus far Certificates of Necessity totaling $6.55 million have been issued. In nearly every instance the amount of the Certificate is 75 pct of the amount applied for, indicating that actual expenditures will be in the neighborhood of $8.2 million.

It is known that additional applications for Certificates are pending and that other projects are in the planning stage.

More Machinery—A large share of this money will be spent for bigger and better equipment such as baling presses, cranes, shears, and so on. A good baling press is almost a must in any modern scrap yard. Chief reason for this is that America's metalworking industry is generating more light scrap today than ever before. This scrap is put into a baling press and emerges in the form of a compact bundle, which is easier to handle and makes a better charge for the melting furnace.

The plans of the Wilkoff Co., Youngstown, O., which will spend more than $300,000 for expansion is typical of what is going on in the industry. Wilkoff expects to double the capacity of its yard to 20,000 tons per month with the installation of a baling press, a new crane runway, two 700-foot rail sidings, and new magnets on scrap-handling cranes. Jobs will be provided for 25 to 30 additional men, raising employment from the present 200.

A tabulation of Certificates issued to the end of June:

Company	Amount Applied for	Amount Eligible	Amount Certified
Samuel Greenfield Co.	$ 136,621	$126,621	$ 94,965
Siskin Steel & Supply Co.	59,792	39,792	29,844
Atlas Steel & Supply Co.	102,040	102,040	76,530
Lederer Iron & Steel Co.	98,253	98,253	73,689
Alaska Junk Co.	70,000	30,000	22,500
Apex Steel & Supply Co.	142,700	142,700	107,025
Steel City Iron & Metal Co.	14,616	14,616	10,962
M. Cohen & Son Co.	53,591	53,591	40,193
Jackson Iron & Metal Co.	20,668	20,688	15,501

Company	Amount Applied for	Amount Eligible	Amount Certified
Mayer Pollock	75,000	75,000	56,250
Hoyne Iron & Steel Co. (copper scrap)	150,111	146,000	109,500
California Bag & Metal Co.	69,000	69,000	51,750
Kaufman Iron & Metal Co.	26,568	26,568	19,926
Ace Iron & Metal Co.	119,366	119,366	89,524
Monroe Scrap Metal, Inc.	125,000	125,000	93,750
Associated Iron & Metal Co.	51,076	40,830	30,622
Commercial Const. Co.	80,138	80,138	60,103
Commercial Metals Co.	50,000	50,000	37,500
Island City Iron & Metal Co.	25,000	25,000	18,750
Moskowitz Bros.	20,000	20,000	15,000
Columbia Iron & Metal Co.	1,023,715	948,715	711,536
Kasle Iron & Metals, Inc.	22,000	22,000	16,500
Berg Metals Co. (scrap steel)	25,471	25,471	19,103
Berman Bros. (scrap steel)	90,000	60,000	45,000
Southern Hide, Wool & Junk Co.	20,000	17,500	13,050
S. Wilkoff & Sons Co.	40,001	40,001	30,000
Commercial Metals Co.	308,000	308,000	231,000
Columbia Iron & Metal (ferrous scrap)	392,902	392,902	294,676
Hutchison Pipe & Waste Co.	34,000	34,000	25,500
Matlow Corp.	45,283	45,283	33,962
The A. Shaw Co., Inc.	198,130	198,130	148,597
Commercial Metals Co.	148,000	148,000	111,000
Columbia Iron & Metal Co. (ferrous scrap)	120,180	120,180	90,135
H. Klaff & Co., Inc.	188,392	188,392	141,294
American Iron & Metals, Inc. (non-ferrous metals or briquettes scrap)	10,000	10,000	7,500
A. Blanche C. Seltz, The Marquette Steel Co.	22,615	22,615	16,961
American Iron & Metals, Inc.	111,500	111,500	83,625
Southern Scrap Material Co., Ltd.	219,131	219,131	164,348
Hockett Engr. Co.	399,641	399,641	300,730
Hockett Engr. Co.	122,839	122,839	92,129
United Iron & Metal Co.	60,000	60,000	45,000
Southwest Steel Corp.	839,688	839,688	629,766
Goldsboro Iron & Metal Co.	10,145	10,145	7,608
A. Blumberg & Bro.	99,000	74,500	74,250
Harry Goldberg & Sons	42,020	42,020	31,515
The Wilkoff Co.	308,600	308,600	231,450
Samuel G. Keywell Co., Inc.	333,639	333,639	250,229
Samuel G. Keywell Co., Inc.	620,000	620,000	465,000
Wm. Mervis & Sons	35,000	35,000	26,250
Kramer Orloff Co.	53,265	53,265	39,948
Southwest Steel Corp	30,751	30,751	23,063
W. F. Wimmer Co.	273,819	273,819	205,364
Specialloy, Inc. (alloy addition agents from scrap)	71,935	71,935	53,881
Jones Iron & Metal Co.	95,820	95,820	71,865
Waste Material Corp.			14,480
Goldberg Iron & Steel Co.			215,000
Commercial Metals			130,601
Hutchinson Pipe & Waste Co.			148,914
Steel Briquette Corp.			35,000
Learner Co.			90,500
Holub Iron & Steel			117,282
Macon Iron & Paper			38,000
Ace Steel Baling, Inc.			41,295
Henry Fligeltaub			41,000
Atlantic Steel & Iron			20,839

Government Fosters Exploration for Ore

Additional sources of strategic materials sought . . . Would explore lead-zinc, copper, tungsten deposits . . . Government will share expense under "matching fund" principle.

The incentive program of prospecting for strategic minerals, recently launched by the Defense Minerals Administration, may offer additional sources from which American industry can draw. How fruitful these new sources will be remains to be seen.

Exploration for these potential ore deposits will be carried on under a "matching fund" principle. In the exploration of two lead-zinc deposits in Wisconsin, for example, the government will contribute 50 pct of the cost.

47 Exploration Projects—DMA says that as of June 30, contracts for 47 projects had been approved covering explorations in 14 states. Cost to the government will be $2,192,602, according to the DMA.

Better than half of the projects will be devoted to lead-zinc deposits with copper and tungsten each claiming seven. Other deposits to be explored include: manganese, 2; antimony, 1; cobalt-nickel, 1; sulfur, 2; and asbestos, 3. The asbestos explorations will be conducted by three separate firms in Vermont; all other explorations involved are in the west.

Value of the discoveries will determine how much return the government may expect from its original outlay. The size of the deposits and the volume of the ores will be significant, not only as basis for repayment to the government but also as additional sources for industry.

Will Extend Bauxite Production

The West Indian firm, Reynolds Jamaica Mines, Ltd., will expand its annual bauxite output from 410,000 tons to 750,000 tons by a 70 pct increase in its mining equipment.

Funds for the project include an ECA advance of $3,284,000 and a contemplated expenditure by Reynolds of approximately $450,000 plus the sterling equivalent of $1¼ million. The contract extends a Jamaican bauxite development program initiated last year.

Repayment, plus interest at 4 pct, will be made in aluminum over an 11½-year period. This country will also have the option of buying not less than $750,000 nor more than $1,500,000 worth of aluminum.

To Develop Tungsten Facilities

Additional supplies of tungsten may be made available to the U. S. as a result of an Export-Import Bank loan of $650,000 to the firm of Fermin Malaga Santolalla e Hijos.

Purpose of the loan is to finance expansion of production at the Pasto Bueno mine, near Pampas, Peru. The operators have agreed to sell to the U. S. Emergency Procurement Service all tungsten produced by the mine between January, 1952, and June 30, 1958.

Although the facility has been a small producer for some years, engineers report its ore reserves are adequate to justify further development. Funds made available by the loan will be used for purchase of mine and mill equipment and power plant.

GETTING A LIFT during the Shriner's convention in N. Y. last week. A Model 15 Ross Carrier lift truck touring the city with Al Koran Temple's Little Symphony Band, complete with piano. Driver and owner: Harry M. Righter of Cleveland.

Extend New England Steel Mill Certificate of Necessity

A second extension of a certificate of necessity for a proposed New England steel mill has been granted by NPA. The new 4-month extension was awarded to allow the New England Steel Development Corp. and the New England Council more time to interest a prospective steel company in the undertaking.

Just what negotiations have transpired have not been made public except for an additional report on the project prepared by the H. A. Brassert Co., iron and steel consulting engineers. This report, while agreeing with the original in most respects, offers a more optimistic viewpoint of the potentialities for profit from this particular project.

Brassert Disagrees—The Brassert report estimates the annual market for such a mill as being close to 1,095,000 tons as compared with the original estimate of 610,000 tons. Utilization of available waterways for transportation of raw materials and finished products should offer considerable savings over earlier estimates, Brassert says.

To increase capacity of the plant, and for greater economy, it is suggested that two 1250-ton blast furnaces be built instead of one larger furnace. Mr. Brassert also believes iron ore and coal can each be delivered $1 a ton cheaper than the earlier report by Coverdale & Colpitts estimated.

WAREHOUSES—Watch Steel Stocks Melt Away

Stocks are only 20 to 30 pct of what they were at end of 1949 . . . Still falling . . . Worst sore spot is in stainless and alloy . . . Relief is needed badly—*By Bob Hatschek.*

Steel warehouses are in a state of total confusion watching their inventories dwindle as they wait for some sort of action out of Washington to clear up the situation. Warehouses play a vital role in industry, as they fill small orders for subcontractors and fill out the voids left in larger orders from steel mills.

Steel distributors are down to about 20 to 30 pct of the stocks they had on hand at the end of 1949 and these stocks are still going down hill. They just cannot replace the material they are selling. One warehouseman expressed it by saying that he had "too much of his capital tied up in cash."

Sore Spot—Steel distributors are assured (NPA, M-6, amended) 85 pct of the average monthly shipments of each product from mills during their base period (first 9 months of last year). This includes rated orders.

The particular sore spot is stainless and alloy steel, for which there are no provisions in NPA's M-6 order. Men in the trade are waiting expectantly for "an M-6 on alloy and stainless."

They really need relief in this respect. Carbon steel stocks are not quite as depleted and tool steel, by comparison, is more plentiful.

How Many Tickets?—In the carbon grades, structurals and plates are in definitely rugged shape, while bars are in a little better supply. All supplies, regardless of grade or shape, are slowly evaporating—and warehousemen wish it were slower.

There is some fear that NPA has alloted more tickets than there are seats for this steel procurement game and there is even some feeling that NPA doesn't know how many tickets have gone out. Distributors know this would make CMP unworkable.

The sole consolation to warehousemen is that they are all in the same predicament. While some of their customers claim they have gotten a few scarce items from competitors, they know that they have a few items that others cannot supply. It is, however, a very slight recompense.

May Finished Steel Shipments

As Reported to the American Iron & Steel Institute

STEEL PRODUCTS	CURRENT MONTH					TO DATE THIS YEAR				
	Carbon	Alloy	Stainless	Total	Pct of Total Shipments	Carbon	Alloy	Stainless	Total	Pct of Total Shipments
Ingots	67,500	21,091	1,579	90,170	1.3	385,758	94,291	8,796	488,845	1.5
Blooms, slabs, billets, tube rounds, sheet bars, etc.	143,673	57,104	1,630	202,407	2.9	*689,737	237,915	7,508	*935,160	2.8
Skelp	9,665			9,665	0.1	55,205			55,205	0.2
Wire rods	75,371	1,184	542	77,097	1.1	357,392	8,619	1,976	367,987	1.1
Structural shapes (heavy)	421,114	8,795	5	429,914	6.2	2,021,959	34,340	47	2,056,346	6.1
Steel piling	33,982			33,982	0.5	165,503			165,503	0.5
Plates	677,820	36,603	1,757	716,180	10.3	*3,014,892	180,990	7,730	*3,203,612	9.6
Rails—Standard (over 60 lbs.)	152,038	22	.....	152,060	2.2	702,041	96	.....	702,137	2.1
Rails—All other	13,585	8	.....	13,593	0.2	59,638	32	.....	59,670	0.2
Joint bars	12,237			12,237	0.2	57,534	.....	.....	57,534	0.2
Tie plates	41,011	.....	.....	41,011	0.6	196,556	.....	.....	196,556	0.6
Track spikes	15,321	.....	.....	15,321	0.2	*71,020	.....	.....	*71,020	0.2
Wheels (rolled & forged)	37,134	.....	.....	37,134	0.5	167,566	40	.....	167,606	0.5
Axles	19,848	99	.....	19,947	0.3	94,444	241	.....	94,685	0.3
Bars—Hot rolled (incl. light shapes)	571,262	212,347	3,500	787,109	11.3	*2,767,069	943,093	17,274	*3,727,436	11.2
Bars—Reinforcing	162,372	.....	.....	162,372	2.3	*766,897	.....	.....	*766,897	2.3
Bars—Cold finished	140,227	30,285	3,692	174,204	2.5	633,489	139,909	17,693	791,091	2.4
Bars—Tool steel	3,073	11,849	.....	14,922	0.2	*13,730	*55,955	.....	*69,685	0.2
Standard pipe	255,734	201	5	255,940	3.7	*1,231,576	723	23	*1,232,322	3.7
Oil country goods	144,738	20,197	.....	164,935	2.4	683,335	93,097	.....	776,432	2.3
Line pipe	270,695	124	.....	270,819	3.9	1,233,070	607	.....	1,233,677	3.7
Mechanical tubing	55,709	28,090	571	84,370	1.2	280,262	122,008	2,628	404,898	1.2
Pressure tubing	22,748	1,685	903	25,336	0.4	108,705	8,669	4,201	121,575	0.4
Wire—Drawn	282,201	5,488	2,928	290,617	4.2	1,377,518	23,898	13,260	1,414,676	4.2
Wire—Nails & staples	77,214	.....	6	77,220	1.1	375,000	.....	23	375,023	1.1
Wire—Barbed & twisted	19,698	.....	.....	19,698	0.3	96,658	.....	1	96,659	0.3
Wire—Woven wire fence	39,462	.....	.....	39,462	0.6	190,838	.....	.....	190,838	0.6
Wire—Bale ties	8,961	.....	.....	8,961	0.1	42,311	.....	.....	42,311	0.1
Black plate	78,939	.....	.....	78,939	1.1	405,105	.....	.....	405,105	1.2
Tin & terne plate—Hot dipped	149,385	.....	.....	149,385	2.2	686,774	.....	.....	686,774	2.0
Tin plate—Electrolytic	246,122	.....	.....	246,122	3.6	1,167,915	.....	.....	1,167,915	3.5
Sheets—Hot rolled	658,074	29,886	3,892	691,852	10.0	*3,403,593	140,506	16,894	*3,560,993	10.7
Sheets—Cold rolled	847,488	11,641	8,578	867,707	12.5	*4,203,729	49,601	41,674	*4,295,004	12.9
Sheets—Galvanized	175,393	1,917	.....	177,310	2.6	*843,768	6,852	.....	*850,620	2.5
Sheets—All other coated	23,429	.....	.....	23,429	0.3	110,470	.....	.....	110,470	0.3
Sheets—Enameling	19,919	.....	.....	19,919	0.3	94,297	.....	.....	94,297	0.3
Electrical sheets & strip	13,419	53,709	.....	67,128	1.0	62,877	260,009	.....	322,886	1.0
Strip—Hot rolled	198,525	4,351	690	203,566	2.9	1,069,338	18,859	3,048	1,091,245	3.3
Strip—Cold rolled	166,896	3,028	16,744	186,668	2.7	811,247	12,823	87,370	911,440	2.7
TOTAL	6,351,982	539,704	47,022	6,938,708	100.0	*30,698,816	*2,433,173	230,148	*33,362,135	100.0

During 1950 the companies included above represented 99.0% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

More Flat-Rolled Production In Pittsburgh's Plans for Future

Pittsburgh Steel Co. is getting out of the semi-finished steel business. The company has told stockholders that this is part of its long-range expansion and improvement program.

At present, Pittsburgh's product mix is 32 pct semi-finished (normally unprofitable), 35 pct tubular products and 33 pct wire products. When the program is completed, this will be changed to 52 pct flat-rolled products, 27 pct tubular products and 21 pct wire products.

Pittsburgh is now in the process of acquiring Thomas Steel Co., which will put it in the flat-rolled steel business immediately. The company is constructing a blooming mill, which will be in operation Nov. 1, and a 66-in. hot rolled strip mill now scheduled to be in production next July.

Pittsburgh Steel Co. earnings in the first five months of 1951 were 68.5 pct ahead of the same

period of 1950. Shipments were 18.89 pct greater.

Stockholders were asked to approve an increase in the number of common shares the company may issue from the present 1 million to 1.5 million. A special meeting will be held Aug. 9. Exchange of stock is part of the plan for acquiring Thomas Steel.

STRUCTURALS—Even "Essential" Users Cut

Fourth quarter requirements filed with DPA already double expected production . . . Even some defense users must be shaved . . . But nondefense users will get sharpest cuts.

Consumers of structural steel shapes, including some defense users, are facing cutbacks in their fourth quarter allotments. There just won't be enough—even for "essential" uses.

Requirements already filed with DPA add up to twice as much as the estimated production for the quarter. Submitted needs total 2.4 million tons against an estimated output of 1.3 million tons. Thus advance warning that structural needs can't all be filled for some time proves to be well founded.

Biggest claimants were contractors for industrial construction, who want 290,000 tons. Direct military needs were filed as 120,000 tons, while freight-car builders have requested 115,000 tons. Federal, state, and local government agencies say they need another 140,000 tons for schools, hospitals, and the like.

Austerity for Some — Officials are now screening requirements. They say the sharpest cuts obviously must be made in nondefense uses, and that "worthy projects," such as schools and highways will have to wait temporarily for needed materials.

And while industrial expansion and military construction will be given preference, NPA said, some of the less important of these must settle for less than actually needed during the quarter.

Controls have so far failed to hold 1951 building activities to last year's dollar volume. For the first half, Commerce Dept. figures show a 16 pct gain over the 1950.

Big Gains—Value of new construction through June amounted to $13.9 billion, as compared with $11.9 billion last year. Industrial building, at $900 million, more than doubled last year's half-year total. Military construction, at $321 million, was five times greater.

Residential building was down 2 pct in dollar volume but had fallen off nearly 20 pct in unit volume.

Open First Pipe Mill in Israel

A pipe mill, opened recently at Acre, Israel, is the first unit of the Solel Boneh Steel Works and represents the birth of a steel industry in that nation. The entire project, when completed, will represent a $10 million investment and will include a steel rolling mill, iron foundries and electric furnace facilities besides the pipe mill.

Capacity of the pipe mill is 2000 tons a month of 3, 4 and 6-in. diameter pipe on a single shift basis and three-shift operations will begin as soon as raw materials are available. The pipe is vitally needed in Israel's irrigation program.

Tools for Canada's Oil Boom

A number of the oil tool manufacturers in southern California are keeping a weather eye on developments in Western Canada where oil fields of great potential are being brought into production. Several California companies specializing in this field already have plans for plants in Alberta but are keeping quiet. Drill pipe shortage may hamstring some exploratory work there as it has in the United States.

Latest aid to drilling has been announced by Byron Jackson Co. of Los Angeles. It is a hydraulically controlled unit which eliminates all but three men from the drilling rig and cuts costs.

STEEL PRODUCTION (Ingots and Steel for Castings)

As Reported to the American Iron & Steel Institute

	Openhearth		Bessemer		Electric		Total			
1950	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Calculated Net Tons Weekly	No. Weeks in Month
1st Qtr.	20,032,745	93.4	900,543	65.9	1,309,363	77.3	22,242,651	90.7	1,729,600	12.86
April	7,318,720	102.3	407,909	89.5	497,875	88.1	8,224,504	100.6	1,917,134	4.29
May	7,601,880	102.9	437,006	92.9	525,321	90.0	8,564,207	101.4	1,933,230	4.43
June	7,222,185	100.9	406,944	89.3	514,101	90.9	8,143,230	99.6	1,898,189	4.29
2nd Qtr.	22,142,785	102.0	1,251,859	90.6	1,537,297	89.7	24,931,941	100.5	1,916,367	13.01
1st 6 Mos.	42,175,530	97.7	2,152,402	78.3	2,846,660	83.5	47,174,592	95.7	1,823,525	25.87
July	7,224,306	97.0	380,317	79.8	478,299	79.7	8,082,922	94.8	1,828,715	4.42
August	7,318,908	98.0	405,118	84.8	518,148	86.1	8,242,174	96.5	1,860,536	4.43
September	7,262,359	100.7	409,216	88.7	533,422	91.7	8,204,997	99.4	1,917,055	4.28
3rd Qtr.	21,805,573	98.6	1,194,651	84.4	1,529,869	85.8	24,530,093	96.9	1,868,248	13.13
9 Mos.	63,981,103	98.0	3,347,053	80.4	4,376,529	84.3	71,704,685	96.1	1,838,582	39.00
October	7,734,714	103.6	436,835	91.5	581,137	96.6	8,752,686	102.4	1,975,776	4.43
November	7,111,829	98.4	370,659	80.1	540,905	92.8	8,023,393	97.0	1,870,255	4.29
December	7,434,863	99.8	380,011	79.8	540,437	90.0	8,355,311	98.0	1,890,342	4.42
4th Qtr.	22,281,406	100.6	1,187,505	83.8	1,662,479	93.1	25,131,390	99.2	1,912,587	13.14
2nd 6 Mos.	44,086,979	99.6	2,382,156	84.1	3,192,348	89.4	49,661,483	98.0	1,890,426	26.27
Total	86,262,509	98.7	4,534,558	81.3	6,039,008	86.5	96,836,075	96.9	1,857,232	52.14
1951[2]										
January	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
February	6,935,512	99.3	326,112	75.6	504,077	87.0	7,765,701	97.1	1,941,425	4.00
March	8,059,625	104.2	408,926	85.6	602,504	93.9	9,071,055	102.4	2,047,642	4.43
1st Quarter	22,840,119	101.7	1,166,763	84.2	1,673,041	89.8	25,679,923	99.9	1,996,884	12.86
April	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29
May[1]	8,071,270	104.3	408,650	85.6	614,579	95.7	9,094,499	102.7	2,052,934	4.43
June[2]	7,669,000	102.4	403,000	87.1	586,000	94.3	8,658,000	101.0	2,018,000	4.29
2nd Qtr.[2]	23,597,431	103.9	1,204,122	85.9	1,791,467	95.0	26,593,020	102.3	2,044,045	13.01
1st 6 Mos.[2]	46,437,550	102.8	2,370,885	85.0	3,464,508	92.4	52,272,943	101.1	2,020,601	25.87

Note—The percentages of capacity operated (1951) are calculated on weekly capacities of 1,746,337 net tons open hearth, 107,806 net tons Bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of January 1, 1951 as follows: Open hearth 91,054,020 net tons. Bessemer 5,621,000 net tons, Electric 7,554,630 net tons, total 104,229,650 net tons.

[1] Revised. [2] Preliminary.

Appliance Assn. Fights Proposed Natural Gas Ban

Gas industry is "whipping boy" of defense effort claims GAMA official

A hearing of industry protests against a proposed order preventing new users from getting natural gas (See THE IRON AGE, July 12, p. 107) has been demanded of Secretary of the Interior Oscar Chapman. The demanding group is the Gas Appliance Manufacturers' Assn. The ban was proposed by the Petroleum Administration for Defense to conserve steel which would be used in pipeline construction and other expansion.

GAMA claims the backing of five other industry groups: wholesale heating and plumbing suppliers, boiler and radiator makers, piping and air conditioning contractors, the Central Supply Assn., and the Master Plumbers' Assn. Their argument is that the contemplated order is contradictory to previous approvals on pipeline jobs and certificates of necessity in their industry.

GAMA Officials Criticize — In criticizing the proposed order, Frederick Hess, president of GAMA, said there was no reason to make the gas industry the "whipping boy" of the defense effort. If sufficient steel were allocated for pipe production, he charged, the gas industry could then help "relieve the pressure on the other fuels which is sure to follow in the wake of a gas restriction order."

H. Leigh Whitelaw, GAMA managing director, cited a growth of 5 trillion cu ft to 186 trillion cu ft of known natural gas reserves and claimed that such restrictive measures were contrary to public interest.

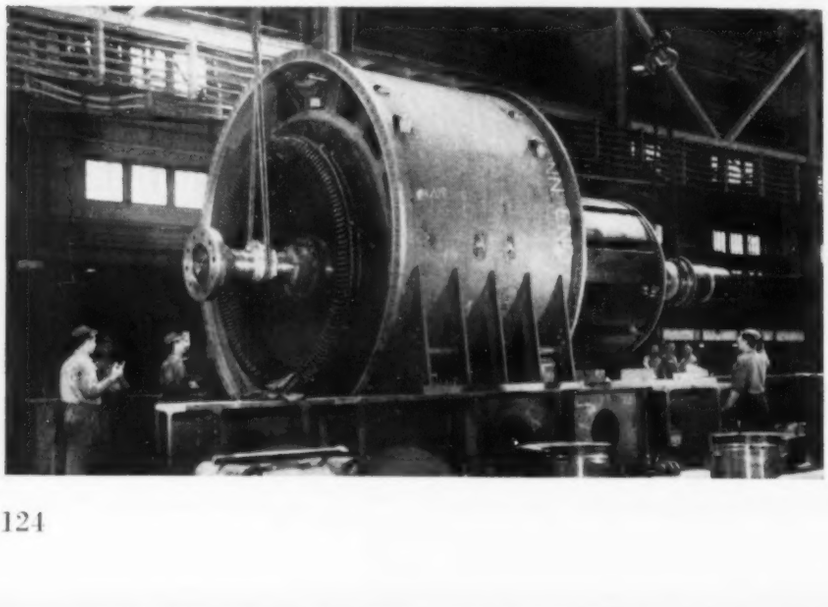
Air Force Suppliers Can Pick Needed Tools from Reserve

Several billion dollars worth of machine tools will be made available to holders of Air Force facilities contracts after July 23, in order to improve the utilization time of many items now being warehoused by Industrial Equipment Section of Air Material Command.

It is hoped that the loan plan, whereby the contractor may go directly to one of two storage sites to select needed tools, will aid industrial mobilization. Greater accuracy in selection of exact items needed for specific phases of production also is expected.

Bona fide contractors are entitled to make their selections at either Marietta, Ga., or Omaha, Neb., where stocks of machine tools have been stored since World War II. Hitherto, selection of the tools, including grinders, millers, lathes, drills, routers, press brakes, and screw machines, has been made from stock record cards, with a minimum of physical selection.

THREADING GIANT NEEDLE: Clearance of less than 5/8 in. between rotor and inside of stator of this 50,000-kva hydrogen-cooled synchronous condenser presents a ticklish problem. The 90-ton rotor is guided gently into place by two overhead cranes at General Electric's Schenectady plant.



Freight Car Program Nearly Met, Suffers Steel Allotment Cutback

The freight car production program calling for production of 10,000 cars a month appears to be doomed. Car builders will receive only enough steel from third-quarter allocations to permit production of 28,500 units; 26,000 freight and 2500 tank cars, during the fourth quarter.

June production, substantially the same as May, totaled 9644 domestic freight cars. Orders for 6793 cars were placed in June and as of July 1 there was a backlog of 147,725 cars.

Of the 882,000 tons set aside by DPA, car builders will get about 600,000 tons. One reason for the cutback is that locomotive builders are dissatisfied with their split and the other is that shortages of structural, plate, bar, and alloy steel will not permit any overall increase.

Prior to the NPA allocation, the American Railway Car Institute and the Assn. of American Railroads had expressed hope in meeting the proposed 10,000 car a month program and stated, "But production will begin to slide in the fall unless present steel allocations and receipts are increased."

Metalworking Machinery Directory

A revision of the Munition Board's "Directory of Metalworking Machinery," the first since 1947, is completed and expected to be ready for distribution about Aug. 1.

Included in the listing are approximately 60,000 metalworking machines with descriptions, sizes or capacities. There is also an index of some 800 builders and their products. It will be available at the Government Printing Office ($3.50).

INDUSTRIAL BRIEFS

Deep Sea Mining—GOODYEAR TIRE & RUBBER CO. OF CANADA, LTD., will install a conveyor belt system in the Wabana Mine of Dominion Steel & Coal Co., Ltd., on Bell Island, Newfoundland, which will deliver iron ore at the rate of 1000 tons per hr. Production will be boosted by at least 200 pct. The mine is under the Atlantic Ocean 3 miles off shore and 1600 ft below sea level.

Armco Project — ARMCO STEEL CORP. has begun work on a $2 million project to increase production of electrical steel at Butler, Pa. New annealing furnaces are being constructed and equipment is being added to process the steel.

Expansion — AETNA - STANDARD ENGINEERING CO. is building a new foundry, new general office building and doubling the size of its machine shop at Ellwood City, Pa. These and other installations will cost more than $3 million. A Certificate of Necessity has been issued.

Warehouse Facilities — To increase production and warehouse facilities at its Buffalo and Elyria, Ohio plants, AMERICAN RADIATOR & STANDARD SANITARY CORP. will spend nearly $4 million.

Berry and Oliver Merger—Berry Motors, Inc., has merged into OLIVER IRON & STEEL CORP., Pittsburgh. Oliver acquired all assets, patents and property of Berry Motors which will be operated as the Berry Div., and will continue to manufacture at the Corinth, Miss. plant its patented motors and industrial transmissions.

Cuts Operating Costs — McLEAN TRUCKING CO., Winston-Salem, N. C., has converted its entire fleet of tractors from 200-hp diesels to 133-hp diesels. The switch was made in order to achieve lower operating and maintenance costs while getting 15 pct more payload per unit through decrease in vehicle weight.

Venezuelan Distributor—U. S. Air Conditioning Corp. has appointed P. C. BOUSQUET G. & CO. and STOLK & BOUSQUET of Caracas, as exclusive representatives and distributors of usAIRco products in Venezuela.

Easing Housing Problem—Plans for construction of homes in East Chicago for 100 INLAND STEEL CO. families have been announced. Formal applications are being made for necessary authorization from the federal government under national emergency regulations.

Advertising Awards—Two major industrial advertising awards have been won by TINNERMAN PRODUCTS INC., Cleveland. The company's 1950 campaign based on the Tinnerman speed nut savings stories, won first place in the Putman Award contest and one of the three places in the National Industrial Advertisers Assn. annual competition.

New Techniques—PERFECT CIRCLE CORP. has retained the engineering service division of Cro-Plate Co. for an extended period of time to incorporate increased production-line techniques in the chrome-plating of Perfect Circle piston rings. This research and development program will be in operation at a newly constructed Perfect Circle pilot plant in Hagerstown, Ind.

Rehabilitation — NORRIS-THERMADOR CORP. has entered into a contract with Army Ordnance to establish a plant for the manufacture of steel cartridge cases at Riverbank, Calif. The company will perform the engineering services, acquire for government account and install special manufacturing facilities having an estimated cost of nearly $20,000,000. The plant was originally built during World War II by the Aluminum Co. of America.

Navy Nods—The Navy's Bureau of Ships has awarded BATH IRON WORKS, Bath, Me., a contract to build 2 landing ships, tank (LSTs). The landing craft are included in the 15 LSTs the Navy expects to get under terms of the fiscal 1952 shipbuilding program. Bureau of Ships will award contracts for construction of the remaining 13, on a competitive-bid basis.

Incorporating Facilities—Sales and engineering functions of the Water Treating Section of WORTHINGTON PUMP & MACHINERY CORP. were moved from Dunellen, N. J., to the company's Harrison, N. J., plant.

GE Supplies Equipment—Lone Star Steel Co. has ordered more than $4 million of equipment from GENERAL ELECTRIC CO. for their new steel mill now under construction at the East Texas Works.

Officers Elected — Warden F. Wilson, general sales manager, LEBANON STEEL FOUNDRY, Lebanon, Pa., has been elected president of Alloy Casting Institute. Other officers elected: H. T. Harrison, vice-president; E. A. Schoefer, secretary and treasurer; G. A. Baker, and J. S. Wooters were elected to three-year terms as members of the board of directors.

Logan Celebrates 75th Birthday—Starting in 1876 under the name of THE DOW CO. it was a metalworking concern. Eight years after its inception the management of the firm was taken over by W. Hume Logan and still is under the active management and ownership of the Logan family.

New Acquisition—PRESSED STEEL CAR CO. has acquired the 53 year old Chicago Steel Tank Co. The acquisition includes two subsidiary companies, Steel Erectors, Inc., and Conduit Fittings Corp. That brings to five the number of steel fabricating companies Pressed Steel has acquired since its product diversification program began.

To Boost Headlight Output—WESTINGHOUSE ELECTRIC CORP. will construct a plant near Madison, Ind., which will increase its headlight manufacturing facilities by 50 pct. The site for the plant is an 80-acre plateau located 2 miles from Madison.

Offices Moved—A subsidiary of the Granite City Steel Co., GRANCO STEEL PRODUCTS CO. has moved its offices from Granite City, Ill., to space in a Dow Chemical Co. building in Madison, Ill. All production facilities will remain at the parent company's plant.

New National Bureau Center—The new NATIONAL BUREAU OF STANDARDS LABORATORY center at Corona, Calif., will be known as the Corona Laboratories and concerned with technical problems for the Department of Defense.

TOOLS—OPS Writes New Pricing Order

Builders allowed 80 pct of average profit from 1938 to 1948 . . . For individual tool allowance is cost plus 5½ pct . . . Industry says order doesn't provide output incentive.

Office of Price Stabilization this week (July 16) granted long-overdue price relief to the machine tool industry. Manufacturers are now permitted to raise their ceiling prices high enough to realize 80 pct of their average rate of return during the years 1938 through 1948.

Defense Mobilizer Charles E. Wilson had ordered the price control agency to ease the cost-price squeeze that has been plaguing the industry in recent months. He said the cost of delay in waiting for machine tools would far exceed the cost of the tools.

Cost Plus 5½ Pct—The new order (GOR 15) applies to toolbuilders (prime contractors and subcontractors who build complete tools) formerly pricing under CPR 30 and those under GCPR. It provides for price adjustments on an over-all basis or for a particular machine tool without regard to the applicability of other OPS regulations. For a particular machine tool or machine tool attachment, a manufacturer may secure an adjustment giving him his total unit costs, plus a profit of 5½ pct.

Tool-builders are required to file reports with the OPS Industrial Materials and Manufactured Goods Div. before selling at the higher prices permitted by the new regulation. Within 60 days after a year has elapsed, they must show actual rates of return compared with previous calculations, or in the case of particular adjustments, actual average total unit costs.

Profit 80 Pct of Base—The new order permits manufacturers to adjust their ceiling prices whenever they can demonstrate an actual or threatened reduction in their rate of return, before income and excess profits taxes, to a point below 80 pct of their 1938-1948 average rate of return. If they did not sell tools during those years, they use 21 pct as the rate of return. Similarly, ceiling prices on particular items may be adjusted whenever they fall below 105½ pct of total unit costs.

OPS requires that refunds be made when actual rates of return prove to be 5 pct or more above the over-all or the particular standards provided in the regulation.

Wilson Goes to Bat—Wilson's instructions to OPS also were dispatched to DPA, NPA, ESA, GSA, Defense Dept., and Atomic Energy Commission. He called for federal assistance for the machine tool industry through modification of price controls; procurement of adequate facilities, materials and components; easier financing; pooling orders and encouragement of subcontracting to assist the small manufacturers; and overcoming manpower shortages.

"Immediate steps should be taken to enable metalworking tool builders to devote their entire energies to production, to provide them with genuine incentives for all-out production, and to channel their production best to meet defense requirements for ourselves and our allies."

Industry Sceptical

Machine tool builders who had seen the new OPS price order early this week took a dim view of it as an incentive to more production.

They feel that if OPS was in fact aiming at the incentive target called for by Mobilization Chief Wilson they fired a wild shot.

A full account of machine tool industry reaction will be found on page 33.

Industry Controls This Week:

NPA Orders

M-16, Amendment—Places all copper raw materials under complete allocation. Effective as of Aug. 1.

M-1, Amendment—Establishes new set-aside percentages of carbon and alloy steel for September and subsequent months.

OPS Orders

GCPR, SR 38—Provides price relief for producers of pig iron from foreign ore and those who sell on long-term contracts with escalator clauses.

GOR 15—Permits adjustments to ceiling prices of machine tools (see story this page).

Industry Opposes NPA Proposal

Industry has registered stiff oppositon to a proposed NPA order by which end uses of diamond grinding wheels would be restricted. Object would be to conserve supplies of diamond bort because of shortages.

Instead, industry recommends complete allocation and a salvage program. Since the primary use of diamond wheels on carbide tools would still be permitted under the order, it is felt that end use bans would hurt small business and save but little material.

NPA Restricts Steel Drum Use

Uses of both new and used steel drums are restricted under Order M-75, issued by NPA. An inventory restriction of a 45-day supply is also imposed.

Reports to the agency indicate an order backlog of about 9 million because of metal shortage.

DEFENSE CONTRACTS

Week of July 12, 1951

Crane rails—Landers & Griffin, Inc., Portsmouth, N. H.

Fuel distribution system—A. T. R. Construction Co., Inc., Newport, R. I.

Hospital sprinkler system—Carlysle Engineering, Inc., Boston, Mass.

Design and fabrication of fixtures and gages—Quality Hardware Mach., Chicago

Design and fabrication of fixtures and gages—Jefferson Tool & Gauge Co., Detroit

Mesh and bars—K-C Construction Supply Co., Denver

Valves—Oakland Machine Works, Oakland, Cal.

Stove spare parts—Gray & Dudley Co., Nashville, Tenn.

Pumps—Bardes Forge & Foundry Co., Lawrenceburg, Ind.

Spare parts—Cornell Dubilier Electric Corp., Indianapolis

Generator sets—Consolidated Diesel Electric Corp., Stamford, Conn.

Impregnating plants—Amer. Laundry Machinery Co., Cincinnati

Compressed air plant—Penna. Pump & Compressor Co., Phila.

Spare parts—Cline Electric Mfg. Co., Chicago

Engine generators—Wisconsin Motor Corp., Milwaukee

Armament parts—Columbus Engineering Co., Columbus, O.

Signal operator—Boonton Radio Corp., Boonton, N. J.

Regulator assy.—Rochester Prod. Div. GMC, Rochester, N. Y.

Aluminum alloy angles—Detroit Gasket & Mfg. Co., Detroit

Diaphragm assy.—Thompson Products, Inc., Cleveland

Locks, pad sets—The Eagle Lock Co., Terryville, Conn.

Fuel quantity indicator—Aviation Engineering Corp., Woodside, N. Y.

Jet engine starter—Bendix Aviation Corp., Teterboro, N. J.

Steel tool boxes—Mastercraft Products, Inc., Phila.

Hydraulic release device—Grove Regulator Co., Oakland, Calif.

Indicator assy.—Bendix Aviation Corp., Teterboro, N. J.

Revolver—Colt's Mfg. Co., Hartford, Conn.

Barrel assy. for carbine—Winchester Repeating Arms Co., New Haven

Parts for primer—Calumet & Hecla Consolidated Copper Co., Inc., Detroit

Engine lathes—Moore Machy. Co., Los Angeles

Aluminum roofing—New Holland Metals Co., Mountville, Pa.

Aluminum roofing—Southern States Iron Roofing Co., Savannah, Ga.

Iron pipe coupling—Approved Equipment Mfg. Co., Inc., North Bergen, N. J.

Steel door—Butler Mfg. Co., Kansas City, Mo.

Installation of elevator—James P. McKenna, Albany

Cannon parts—Worthington Mower Co., Stroudsburg, Pa.

Cannon parts—The Fuller Brush Co., Hartford, Conn.

Rocket head fuses—Swank, Inc., Attleboro, Mass.

Spare parts—Ross Carrier, Benton Harbor, Mich.

Spare parts—Vickers Inc., Detroit

Spare parts—Chrysler, Detroit

Jet fuel storage—Gerguson Corp., Hampton, Va.

Replace steam & air line—McCrary Piping & Heating Co., Charleston, S. C.

Jet fuel pipe line—Nichols Construction Co., Miami, Fla.

Presses, tools, etc.—Verson Allsteel Press Co., Chicago

Prefab Arctic huts & tools—Canadian Commercial Corp., Washington, D. C.

Standard cemented carbide, blanks, and tipped tools—Firth Sterling and Steel and Carbide Corp., McKeesport, Pa.

Machines, floor polishing—Holt Mfg. Co. of N. J., Newark, N. J.

Trimming machines—The V & O Press Co., Hudson, N. Y.

Dies, taps, etc.—Brubaker Tool Co., Millersburg, Pa.

Jacks—The Duff-Norton Mfg. Co., Pittsburgh

Jacks, hydraulic—Dayton Aircraft Products, Inc., Dayton

Fork-gas trucks—The Ross Carrier Co., Inc., Benton Harbor, Mich.

Radial drills—The Carlton Machine Tool Co., Cincinnati

Steel melting furnace—Swindell-Dressler Corp., Pittsburgh

Heating furnace, hardening furnace—Sunbeam Corp., Chicago

Tractors and spare parts—The Buda Co., Harvey, Ill.

Tractors & trailers—M-R-S Mfg. Co., Flora, Miss.

Tractors—Minneapolis-Moline Co., Minneapolis

Tractor—Wooldridge Mfg. Co., Sunnyvale, Cal.

Scrapers—Wooldridge Mfg. Co., Sunnyvale, Cal.

Tractor—International Harvester Co., Melrose Park, Ill.

Winch, gen. utility—Jacques Power & Saw Co., Denison, Tex.

Cranes—Bay City Shovels Inc., Bay City, Mich.

Compressor—Le Roi Co., Milwaukee

Conveyor—A. B. Farquhar Co., York, Pa.

Quarry equipment—Ingersoll-Rand Co., Chicago, Ill.

Lathes—Yates-American Machine Co., Beloit, Wis.

Spare parts—Detroit Diesel Engine Div., Detroit, Mich.

Special Rating for Small Firms

Several thousand small manufacturers of consumer durables are to be permitted to use a priority-type order, the allotment symbol "SU," to obtain steel, copper, and aluminum supplies without necessity of applying to NPA.

Small user in this case is defined as one who uses no stainless and whose quarterly requirements for controlled materials do not exceed five tons of carbon steel, 500 lb of copper or copper base alloys, or 500 lb of aluminum.

Those who qualify for materials under this procedure are automatically authorized to apply a "DO-SU" rating for production materials other than steel, copper and aluminum which may be needed for their production schedules.

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DIRECT FIRED GAS BURNERS

FOR FASTER, CLEANER LOWER COST

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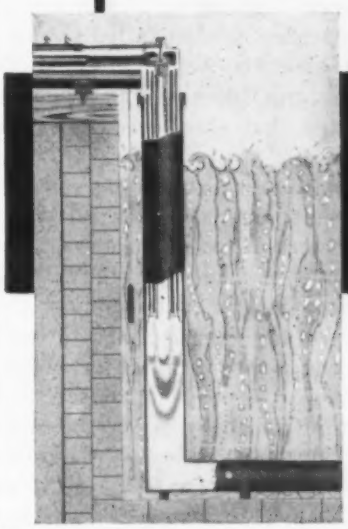

Exposed view of Submerged Combustion Burner installed directly into pickling vat. Automatically gas fired. Thermostatically controlled to keep acid at correct pickling temperature.

★ Flame burns below surface of acid—heats and agitates acid for faster, cleaner pickling.

★ Does not dilute acids—Highly corrosion resistant—Low operating and maintenance cost.

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- ¶ How to clean aluminum in preparation for anodizing? *See page 4.*
- ¶ How to prepare aluminum for spot welding? *See page 10.*
- ¶ How to prepare aluminum for painting? *See page 15.*
- ¶ How to clean aluminum before and after heat treating? *See page 20.*
- ¶ How to strip paint from aluminum? *See page 22.*
- ¶ How to clean magnesium? *See page 27.*
- ¶ How to select and install cleaning tanks, rinse tanks, and spray-washing machines? *See pages 31 to 35.*
- ¶ How to treat water in paint spray booths? *See page 36.*
- ¶ How to clean engine test cells? *See page 40.*

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Impact of Controls Under Investigation

Senate "watchdog" group sniffing for facts . . . spotlight swings on unemployment and duplicate defense plants . . . Steel inventories, gray market, red tape scanned.

Unemployment and the government policy of building parallel defense plants may become the major area of investigation of the Moody "watchdog" senatorial group at its meetings in Detroit.

The investigation was originally set up to throw light on the following questions:

(1) Is there a big gray market for steel?

(2) Is there too much red tape in the mobilization program?

(3) Is too much steel going to defense supporting industries?

(4) Is steel being stockpiled in plants not ready to use it?

Sitting with Senator Moody, R., Mich., are Senator Benton, D., Conn., and Senator Ferguson, R., Mich. Gov. Williams also attended the opening meeting. The committee is expected to take further testimony in Cleveland, Chicago and Pittsburgh.

Proof Lacking — Testimony at the opening session failed to show that steel is being hoarded in large quantities. One witness charged that steel executives are allocating big quantities of steel to relatives who own warehouses and that steel has been allocated to holders of defense contracts in advance of the time it will be needed. He failed to support the charges and also declined to indicate the source of his information.

Senator Moody emphasized that such information is worthless to the committee unless it will permit investigators to follow through on the investigation. The witness was William L. Leininger, president of Leininger Industrial Co., Detroit. He is chairman of the Small Business Committee of the Michigan Economic Development Commission.

GM's Inventory—Most enlightening testimony presented at the opening hearing was given by D. F. Hulgrave, executive in charge of procurement and scheduled activities of General Motors. Mr. Hulgrave said that GM's scheduled output for the third quarter of 1951 is 513,032 cars and 127,576 trucks and buses. During the same period a year ago they assembled 808,911 passenger cars and 152,603 trucks and coaches.

Mr. Hulgrave presented data showing the number of unfabricated tons of steel held by GM.

Date	Net Tons	Days Supply
Jan. 1, 1950	377,834	34.4
July 1, 1950	396,103	23.8
Jan. 1, 1951	380,021	26.9
July 1, 1951	364,904	30.6

Government regulations permit a 45-day inventory, Mr. Hulgrave explained. He said GM is continually operating on fewer days' supply of steel than it would normally have. Lack of balance of its steel inventory is one of the company's most difficult operating problems, he asserted.

How Much Defense? — At the present time, 10 pct of GM's productive facilities are being used for defense, 15 pct in connection with defense supporting and 75 pct in connection with civilian business.

Mr. Hulgrave also testified that 75 pct of GM's present machine tool orders are related to defense or defense supporting industry programs. About 25 pct of the outstanding machine tool orders of the company today are non-defense, he reported. Practically all of these orders were placed prior to the beginning of the emergency period and generally cover types of equipment which are not used in the defense program, he explained.

J. Ivan Fiscus, president of Huron Steel Co., testified that un-

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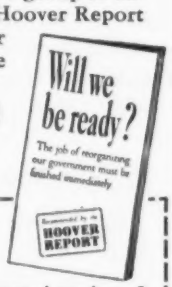
The Hoover Commission and The Citizens Committee for the Hoover Report

The Hoover Commission was created unanimously by Congress in 1947 on a bipartisan basis—6 Democrats, 6 Republicans. *The Citizens Committee* is a bipartisan, nonprofit group to encourage enactment of Hoover Report recommendations for greater efficiency in the Federal Government.



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THE IRON AGE

Controls Digest

Continued

qualified brokers are "moving in" for a quick kill in the steel business.

Bernard J. Teal, Teal Manufactured Products Co., Detroit, said his firm had lost $18,000 since last November because of its inability to obtain steel.

New Set-Aside Percentages Set for Carbon and Alloy Steel

On the basis of an amendment to NPA order M-1, producers are being informed of new set-aside percentages of carbon and alloy steel for September and subsequent months.

Required acceptance ceilings for the additional products are as follows:

CARBON AND LOW ALLOY	PERCENTAGE
Cold finished bars	75
Mechanical tubing, seamless	90
Mechanical tubing, welded	45
Pressure tubing, seamless	95
Pressure tubing, welded	95
High grade electrical sheets	95
Forgings	75
STAINLESS	
Mechanical tubing, seamless	98
Mechanical tubing, welded	98
Pressure tubing, seamless	98
ALLOY	
Ingots	75
Blooms, slabs, billets (including projectile and shell quality)	85
Sheet bars	50
Tube rounds	95
Wire rods	75
Bars, hot-rolled (including projectile and shell quality)	85
Bars, cold finished	75
Mechanical tubing, seamless	95
Pressure tubing, seamless	95
Sheets, hot-rolled	75
Sheets, cold-rolled	75
Strip, hot-rolled	60

All Copper Raw Materials Covered by New NPA Amendment

All copper raw materials will come under complete allocation as of Aug. 1 under an amendment to NPA order M-16 just recently approved.

Materials covered by the order include refined copper, brass mill scrap, copper base alloy scrap, unalloyed copper scrap, fired and demilitarized cartridge and artillery casings, ingots and copper precipitate.

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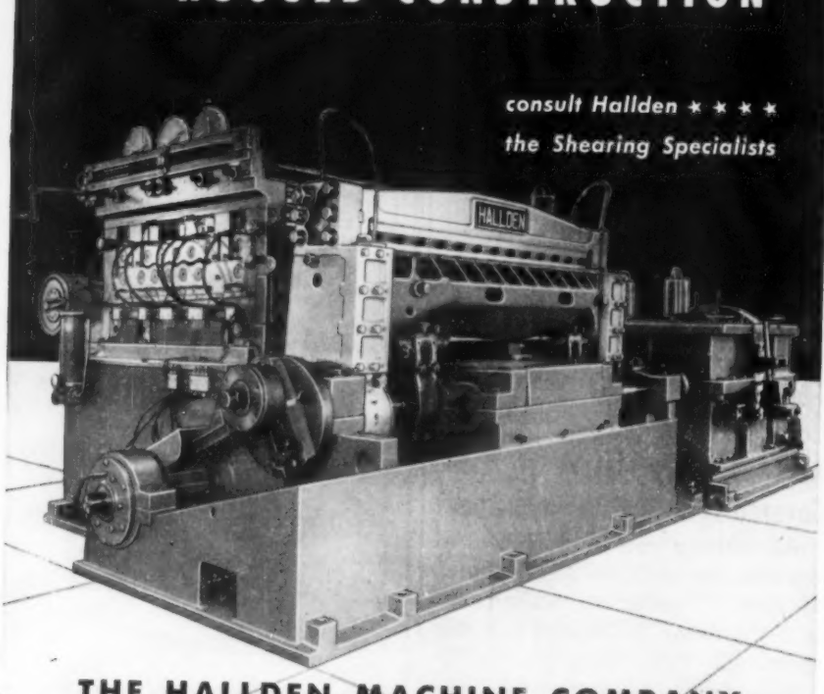

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Sales Representatives
The Wean Engineering Co., Inc., Warren, O. T. E. Dodds, Pittsburgh, Pa.
W. H. A. Robertson & Co., Ltd., Bedford, England

Heads Stainless Steel Section

W. J. McCune, assistant general manager of sales for Sharon Steel Corp., has been appointed chief of the stainless steel section of National Production Authority and will serve for a six-month period beginning July 15. He succeeds C. B. Boyne of Allegheny Ludlum Steel Corp. Mr. McCune also serves on the Stainless Steel Advisory Committee and the Primary Nickel Advisory Committee of NPA. He joined Sharon Steel in the credit department in 1931.

W. J. McCune

Pig Iron Producers Get Relief Through New OPS Price Order

OPS on July 12 invited applications for higher ceiling prices on pig iron from producers who use foreign ore and who sell their products on long-term contracts with escalator clauses.

Some producers would be forced to curtail use of foreign ore and cut pig iron output if the price relief had not been extended, OPS admitted.

The new regulation (SR 38 to GCPR) provides price relief by permitting adjustment in ceiling prices to allow producers to sell at figures determined in accordance with their long-term contracts.

Urge Tailored OPS Regulation

Manufacturers of screw machine products are urging OPS to write a tailored price regulation for their industry.

The industry's products are now priced under GCPR, but are slated for CPR 30 (machinery) coverage when that regulation becomes effective.

Manufacturers are having difficulty determining material cost adjustment under CPR 30 because of the special nature of the indi-

vidual jobs undertaken, extreme variation in the proportion of materials to total costs, and the small fractional unit price of their products.

Small Business Now Sharing Defense With Prime Contractors

Nearly $13½ billion represented in subcontracts awarded by 2 groups

There are increasing signs of the role to be played by small business in the defense program. As subcontractors in the defense effort there are, in two particular instances, more than 62,500 small business firms handling contracts representing nearly $13½ billion. And more firms are being sought.

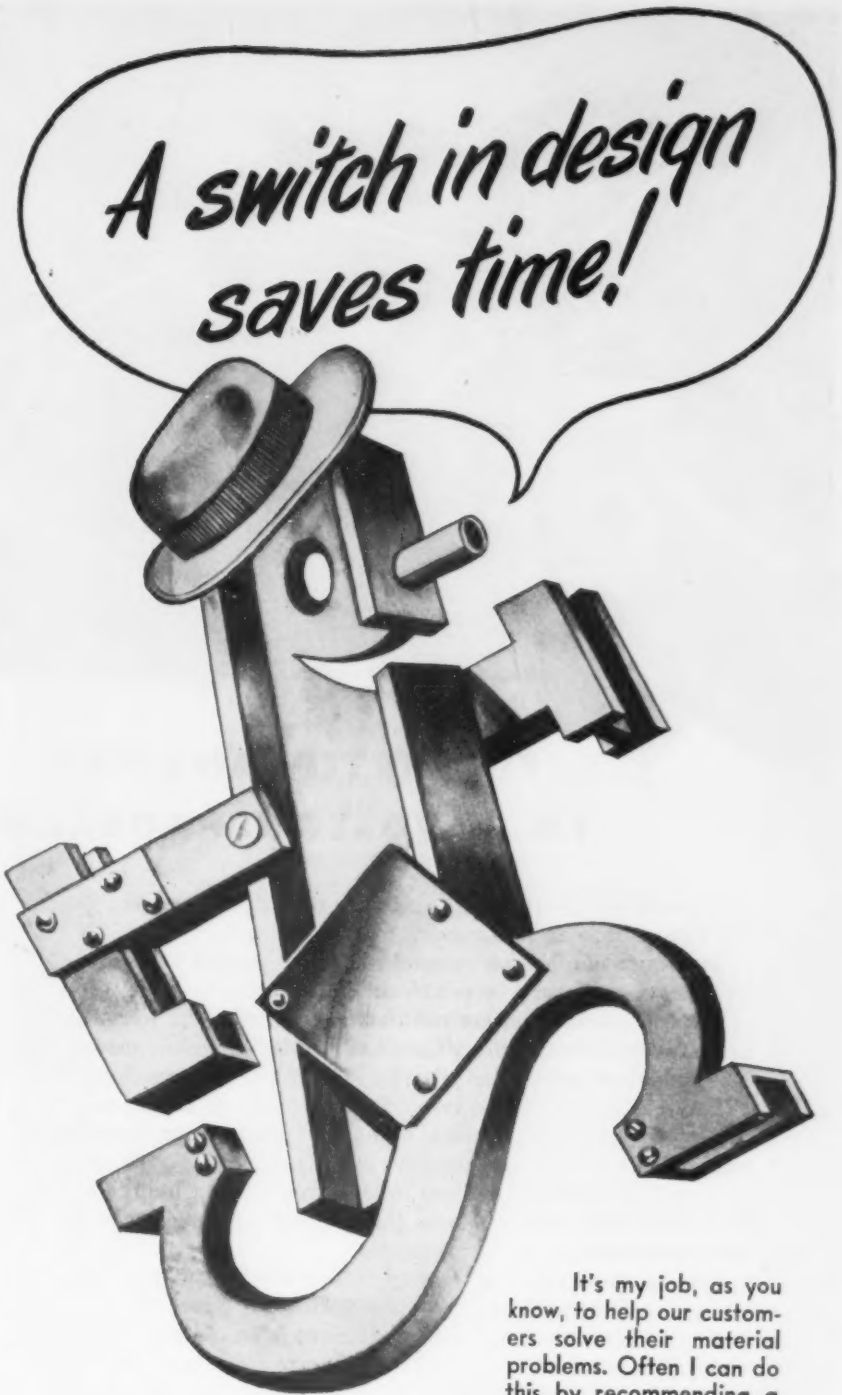
The Aircraft Industries Assn., one of the instances referred to, has reported that $13 billion worth of subcontracts are going to 60,850 small business organizations, of which more than 52,000 have less than 500 employees.

One other indication of increased participation of small business is reflected in a statement by International Harvester Co. that 80 pct to 90 pct of the material required by them to fulfill prime contracts will be subcontracted through small business. The dollar value of these subcontracts is approximately $355 million. To date the company has contracted with 327 firms who, in turn, have made arrangements with 1377 subcontractors of their own.

In the case of the Aircraft Industries Assn. it is claimed that 50 pct of the dollar value of aircraft contracts ultimately goes to non-aircraft companies. It has been estimated by International Harvester that on one large motor truck contract nearly 90 pct of the dollar volume is subcontracted.

Name Arenson NPA Consultant

Edward B. Arenson has been named to the post of consultant on the Production Controls Staff of NPA, in which position he will handle CMP construction problems. He has been president of the Toledo Iron & Steel Co. since 1945.



It's my job, as you know, to help our customers solve their material problems. Often I can do this by recommending a change in design to make readily available material do the job, speeding delivery without increasing cost. Remember, I never charge a premium . . . that's company policy.

"Shorty"

LSS-14

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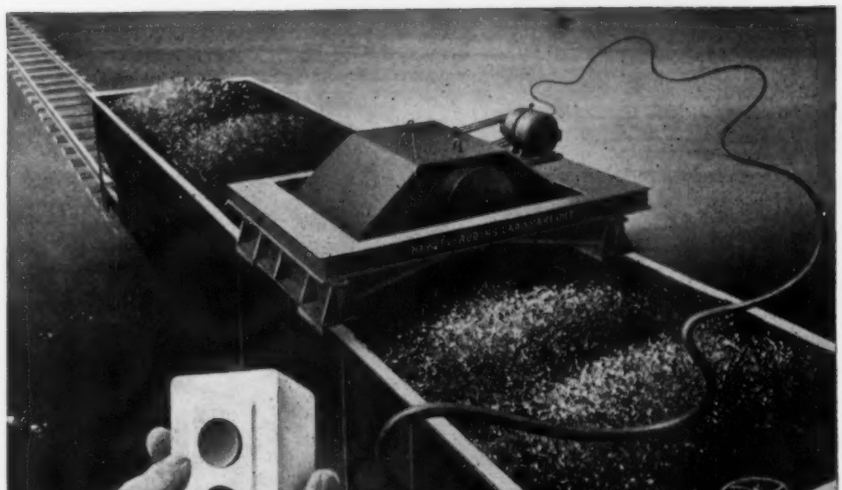

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One touch of a button . . . and even hard-packed loads come free, leaving the car "broom clean"!

For coal, stone, ore, grain—*whatever bulk material you must unload*—the Hewitt-Robins Car Shakeout is the *modern* answer. You save time, money and labor by reducing demurrage charges . . . by cutting unloading crews from as many as twelve to as few as two, even one. You end damage to cars, danger to workmen . . . make a tedious, expensive operation quick, simple, safe.

Over *four hundred million tons* of free-flowing bulk materials have been moved "down the hopper" by Hewitt-Robins Car Shakeouts.

Like so many other notable advances in bulk materials handling, the Car Shakeout is a Hewitt-Robins "first." The *controlled vibration* that makes it so efficient is an old story to us; we've put precisely controlled vibration to work in a long line of time-tested equipment for screening, sizing, feeding, conveying, grading, purifying, dewatering or otherwise processing everything from bits to boulders . . . from pumice to pyrites.

If you have a screening problem . . . *whatever it is* . . . why not make it ours?

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Hewitt-Robins is participating in the management and financing of Kentucky Synthetic Rubber Corporation

Fast Tax Write-Offs

154 certificates
issued by DPA during
June 29-July 6
totaling $125,484,362
2464 authorized to date
totaling $7,721,975,741

Latest DPA certificates listed by company, use, amount applied for, amount eligible, and pct approved.

Raytheon Mfg. Co., Waltham, Mass., transformers, $14,378, $14,079, 85.

Wadell Equipment Co., Garwood, N. J., boring head bodies, $33,275, $33,275, 85.

Gorham Mfg. Co., Providence, electronic mixer assemblies, $63,419, $63,419, 85.

Kell-Strom Tool Co., Inc., Wethersfield, Conn., service tools, $28,411, $28,411, 90.

Pattern Products Mfg. Co., Detroit, aircraft, $47,589, $47,589, 80.

Swallow Airplane Co., Inc., Wichita, aircraft, $18,603, $18,603, 85.

The By-Product Iron & Steel Corp., Cleveland, scrap metals, $31,849, $16,590, 75.

Crocket Mfg. Co., Culver City, Cal., airframe parts, $43,195, $43,195, 90.

Kingston Products Corp., Kokomo, Ind., connection end (forging—steel), $47,928, $47,928, 90.

Earl DeLay & Co., Columbia, S. C., sheet metal products, $30,000, $29,500, 60.

American Steel Foundries, Verona, Pa., steel castings, $381,000, $381,000, 75.

The Parker Appliance Co., Los Angeles, check valves, $470,548, $419,508, 80.

The Gear Grinding Machine Co., Detroit, Mich., universal joints, $279,854, $279,854, 90.

The B. F. Goodrich Co., Los Angeles, aircraft, $345,106, $345,106, 75.

Talley Machine & Mfg. Corp., Los Angeles, aircraft parts, $5,607, $5,607, 90.

General Motors Corp., Muncie, Ind., storage batteries, $245,237, $245,237, 75.

Archer Machine Products Co., Los Angeles, aircraft, $70,636, $70,636, 90.

Aircraft Products Co., Clifton Heights, Pa., aircraft, $28,655, $28,655, 90.

Pantex Mfg. Corp., Central Falls, R. I., aircraft, $29,407, $29,407, 90.

Ex-Cell-O Corp., Highland Park, Mich., machine tools, $214,158, $214,158, 80; aircraft engine parts, $857,175, $857,175, 80.

American Steel Foundries, East Chicago, Ind., steel castings, $58,100, $58,100, 75.

Aircraft Products Co., Delaware County, Pa., aircraft parts, $125,000, $83,985, 75.

Kennametal, Inc., Latrobe, Pa., metal-working tools, $56,686, $56,686, 75.

Reeves-Hoffman Corp., Carlisle, Pa., oscillators, $54,813, $50,765, 75.

The Waco Aircraft Co., Troy, Ohio, aerial delivery kits, $12,476, $12,476, 85.

The Grabler Mfg. Co., Cleveland, malleable iron, $873,582, $213,158, 60.

Pioneer Tool & Engineering Co., Chicago, housings, $90,940, $90,940, 90.

C & S Wreckers, Vancouver, Wash., scrap steel, $297,263, $268,588, 75.

Loral Electronics Corp., Bronx, N. Y., ordnance, $36,349, $31,959, 75.

Michigan Steel Casting Co., Detroit, aircraft, $16,326, $15,510, 75.

United States Pipe & Foundry Co., Decote, Cal., cast iron pipe, $2,867,846, $2,450,360, 60.

Universal Moulded Products Corp., Bristol, Va., ordnance materiel, $7,439, $7,439, 75.

The Patterson Foundry & Machine Co., East Liverpool, Ohio, foundry equipment, $30,000, $30,000, 90.

Pratt & Letchworth Co., Inc., Buffalo, N. Y., armor castings, $70,000, $70,000, 75.

National Broach & Machine Co., Detroit, machine tools, $603,949, $589,710, 80.

General Radio Co., Cambridge, Mass., Electronic test equipment, $725,000, $725,000, 75.

Pratt & Letchworth Co., Inc., Buffalo, N. Y., castings for tank, $210,500, $210,500, 75.

Contour Saws, Inc., Des Plaines, Ill., saw blade, $372,235, $325,635, 80.

R. A. Hawks Co., Sierra Madre, Cal., parts of gas turbines, $15,157, $15,157, 90.

Standard-Thomson Corp., Dayton, aircraft, $31,791, $31,791, 75.

The Turner Brass Works, Sycamore, Ill., cable connectors, $16,201, $16,201, 90.

The Rausch Nut & Mfg. Co., Cleveland, nuts and bolts, $21,450, $21,450, 90.

Reynolds Metals Co., Richmond, Va., reflector material (aluminum), $47,022, $47,022, 75.

J. Leukart Machine Co., Columbus, Ohio, housings, $47,344, $45,844, 80.

M. Gervich & Sons, Inc., Marshalltown, Iowa, scrap iron, $15,000, $15,000, 75.

G. M. Giannini & Co., Inc., Pasadena, potentiometers, $24,580, $22,306, 85; $7,995, $7,616, 85.

American Steel Foundries, Cincinnati, boring mills, $91,000, $91,000, 90.

Affiliated Screw Products Co., Chicago, fine screws, $26,564, $25,311, 85.

All Power Mfg. Co., Montebello, Cal., aircraft, $19,472, $19,472, 90.

The Parker Appliance, Cleveland, tube fittings, $319,198, $319,198, 85.

Tecni-Taps, Inc., N. Attleboro, Mass., taps and rotary files, $8,932, $8,932, 85.

Charles L. Jarvis Co., Middletown, Conn., rotary files, $5,687, $5,687, 75.

Tecni-Taps, Inc., N. Attleboro, Mass., taps and rotary files, $228,853, $219,853, 80.

Luria Brothers & Co., Inc., Ecorse, Mich., scrap iron, $5,674, $5,674, 75.

Luria Brothers & Co., Inc., Medena, Pa., scrap iron, $57,675, $57,675, 75.

Luria Brothers & Co., Inc., Pittsburgh, Pa., scrap iron, $46,117, $46,117, 75.

Fairbanks, Morse & Co., Kansas City, Kan., diesel engines, pumps, $7,828,625, $7,749,770, 70.

International Harvester Co., So. Chicago, Ill., coke and pig iron, $2,082,484, $2,082,484, 85.

Wean Mfg. Co., Warren, Ohio, welding machinery, $173,200, $173,200, 75.

McKiernan-Terry Corp., Dover, N. J., Sonar dome, housings, parts, $620,915, $620,915, 85.

Camden Machine Co., New Haven, steel pipe fittings, $24,678, $24,678, 90.

The Buckeye Aluminum Co., Wooster, Ohio, ordnance, $82,122, $82,122, 75.

The Streine Tool & Mfg. Co., New Bremen, Ohio, machine tools, $245,000, $245,000, 80.

Aluminum Co. of America, Davenport, Iowa, tapered metal sheet and plate, $66,000, $66,000, 60.

Union Carbide & Carbon Corp., Rifle, Col., tungsten metal powder, $55,000, $55,000, 60.

Bridgeport Machines, Inc., Bridgeport, Conn., milling machines, $707,277, $459,877, 80.

The New York Air Brake Co., Watertown, N. Y., locomotive brakes, $35,564, $35,564, 60.

I. J. Cohen & Co., Inc., Kansas City, Kan., scrap metals, $18,033, $18,033, 75.

Hitchiner Mfg. Co., Wilton, N. H., ferrous and non-ferrous castings, $113,016, $112,516, 85.

Klempner Bros., Inc., Louisville, Ky., cast scrap, $26,950, $26,950, 75.

The Carlton Machine Tool Co., Cincinnati, Ohio, drilling machines, $693,281, $693,281, 80.

Phillips Petroleum Co., Bartlesville, Okla., pipeline, $241,460, $241,460, 50.

Bell Aircraft Corp., Fort Worth, helicopters, $3,051,675, $2,906,675, 75.

The Locomotive Finished Material Co., Atchison, Kansas, slush pumps, freight car frames, $107,612, $107,612, 60.

Axelson Mfg. Co., Montebello, Cal., component parts for aircraft, $8,012,077, $8,012,077, 75.

General Electric Co., Lynn, Mass., aircraft, $44,326, $44,326, 75.

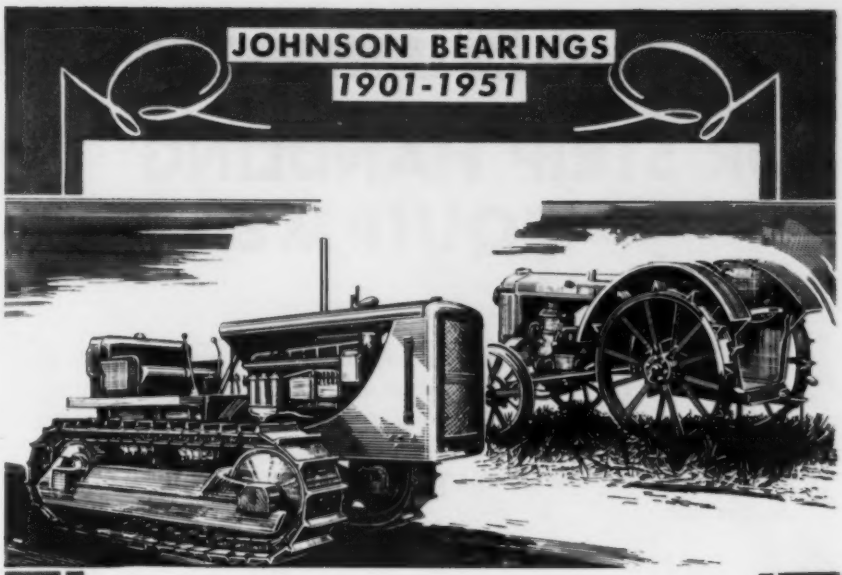
General Electric Co., Everett, Mass., aircraft, $33,389, $33,389, 75.

The H. M. Harper Co., Morton Grove, Ill., bolts, nuts, rivets, $91,000, $91,000, 80.

Libbey-Owens-Ford Glass Co., Toledo, Ohio, gas mask lens, mirrors, periscopes, $592,965, $592,965, 80.

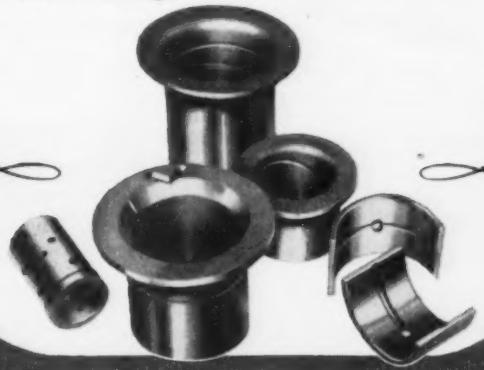
Inland Steel Co., East Chicago, Ind., open hearth steel, $23,248,968, $6,809,386, 70.

St. Joseph Lead Co., Herculaneum, Mo., lead, zinc and cadmium, $2,967,200, $2,478,898, 60.



Machinery and Bearings Both do a Better Job Today

THE MECHANIZATION of the farm of 1951 demonstrates the tremendous strides made in equipment improvement in fifty years. Combines, tractors, electrified machinery and appliances do more work and are more efficient than ever before. Similar progress in sleeve bearings has been made by Johnson Bronze during this time . . . new bearing styles, refinement of bearing alloys, greater precision and closer tolerances. Johnson Thin Wall Bearings, Ledaloyl Self-Lubricating Bearings, and Johnson Aluminum Alloy Bearings now replace the old style bearings of earlier days. Much of this farm equipment is able to out-perform and out-wear earlier models simply because of new and improved Johnson Bearings. For satisfactory performance specify Johnson Sleeve Bearings.



SLEEVE BEARING HEADQUARTERS *Since* 1901

Johnson Bronze

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FOR STRIP HANDLING EQUIPMENT

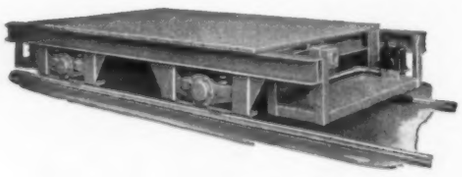
● Strip steel can be handled very economically on rail cars as compared with other means of conveyance. Strip cars can be handled by heavy-duty rubber tired tractors or by locomotives running on the track rails, or they can be self-propelled motor-driven with power supplied by storage battery in the car.

125-Ton DOUBLE TRUCK CAR
for handling steel strip in rolls. This car is hauled by tractor shown below.

SPECIAL HEAVY-DUTY GAS-ELECTRIC TRACTOR
for hauling 125-Ton Strip Handling Cars. Tractors run on rubber tires.

135-Ton FLAT CAR
Powered by storage battery for handling sheet steel.

25-Ton PLATFORM CAR
Powered by storage battery, operates at slow speed and has operator's platform at each end.



ATLAS ENGINEERING SERVICE IS ALWAYS AT YOUR SERVICE

THE ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
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Third Quarter Allocations Set By International Materials Conf.

In line with recommendations made by the International Materials Conference, the Office of International Trade has set exports of contained molybdenum at 1.7 million lb as the third-quarter quota. Nearly 1.5 million lb of the total will be in the form of ores and concentrates. The remainder will include metal, alloys, scrap and wire.

Crude sulfur supplies for the U. S. in the third quarter, as recommended by the Sulfur Committee of the Conference, will amount to 1,050,000 long tons. This allocation represents the greatest portion of the 1,415,400 long tons to be distributed among participating nations. It is expected that firm allocations for the fourth quarter will be recommended not later than Sept. 10.

More Sheet Steel Allocated To British Car Manufacturers

Automobile manufacturers in England are to get 5 pct more sheet steel in the third quarter than in the April-June period. Although sheet steel allocations were reduced by 20 pct over the first 6 months, deliveries were nearer 85 pct than 80 pct.

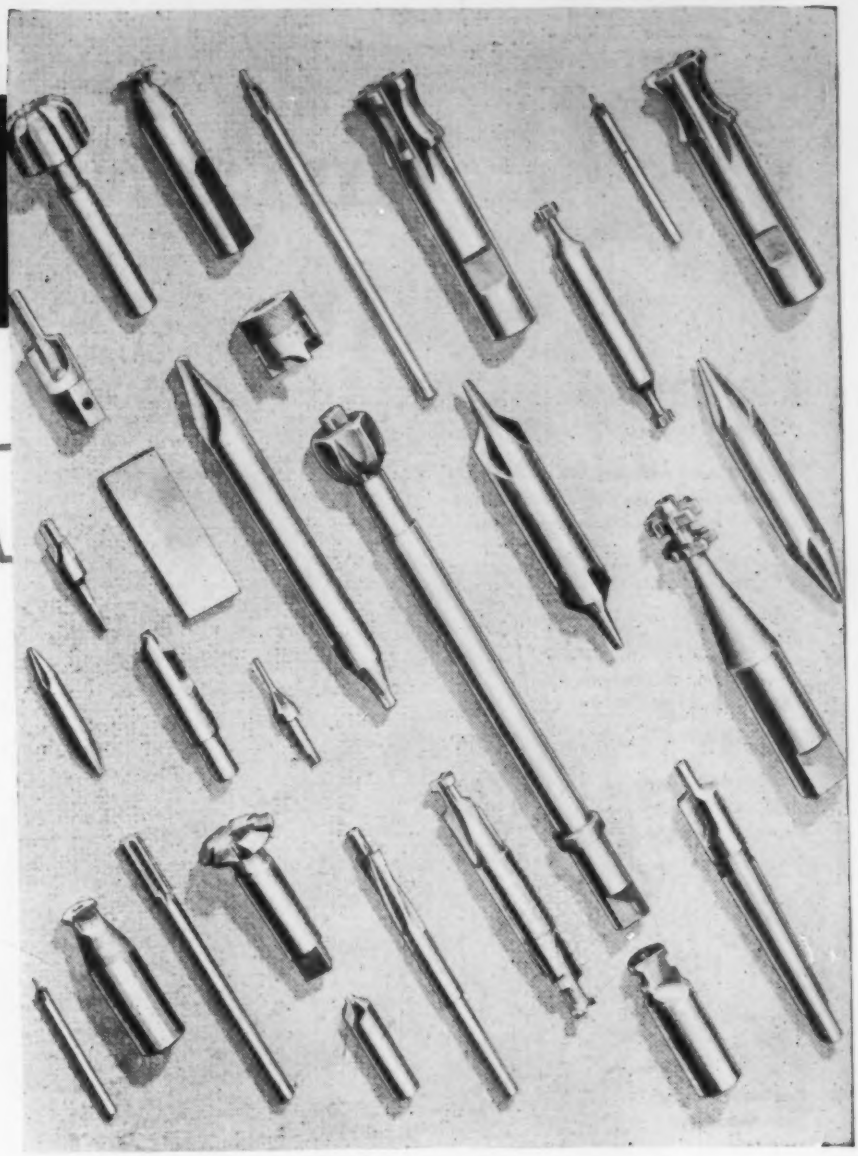
Some firms have had layoffs while others have resorted to a 4-day work week. Production of private cars in the first 4 months of the year was down by 8000 units compared with January-April, 1950. Truck production, which requires less sheet steel (per relative hp) than cars, was up.

N.Y.U. Will Do Titanium Research

Two research projects on titanium will be covered by the Research Div., New York University College of Engineering.

One project involves studies of the Beta-to-Alpha transformation in the quench hardening of titanium-manganese alloys. The other will investigate titanium-rich ternary diagrams with the alloying of carbon-oxygen, carbon-nitrogen, and oxygen-nitrogen.

FINE-EDGE CUTTERS



Want high

Edge Strength?

You can get it

with DBL-2 HIGH-SPEED STEEL

A midwestern tool manufacturer, specializing in fine-edge cutting tools, has found DBL-2 *best* for their purpose—added proof of the high edge strength and excellent cutting qualities of this high-speed steel.

DBL-2 (typical analysis: C .80, W 6.00, Mo 5.00, Cr 4.00, V 1.75) represents the 6-6-2 or M-2 type of tungsten-molybdenum high-speed steel. DBL-2 combines high hardness with toughness. Requiring no more than reasonable care in hardening and tempering, you will find it a high-speed steel of great possibilities—capable of giving you performance equal to, or better than, the general-purpose tungsten types, and at reduced cost.

DBL-2 reliability has been proved in a wide variety of cutting tools. Let us help you to use DBL-2 . . . our Mill Service Staff is at your command.

● *Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

Write for copy of

"CUTTING TOOL MATERIALS"

Allegheny Ludlum produces *all* types: the various tungsten and "moly" high-speed steels, cast-alloy materials, and cemented carbides. This 36-page booklet analyzes and compares types, and covers grade selection, etc.—invaluable data for production men. *Write for your copy.*

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AL FINE TOOL STEELS SINCE 1854

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NEW

WILLSON®

DUST HOOD

Lightweight and Comfortable

Can be used with any WILLSON single filter respirators for dusts, mists, gases, vapors. Available without respirator.

Wide Vision, acetate windows – 33 square inches.

Windows interchangeable, replaced in a matter of seconds.

Canvas hood with snap fasteners on window.

Style 1

Style 2 with No. 46 Respirator

Straps with spring clips to gather hood around body and under arms.

See your WILLSON distributor or write us direct

WILLSON PRODUCTS, INC., 231 Washington Street, Reading, Pa.

Dependable Products Since 1870

American Pressed Metal Team Studies Production in England

European industry teams have made the pilgrimage to America to find out what makes the mighty American productive machine tick. Now the trend has been partially turned with the visits of American industrial investigators to England.

Arriving in England on June 27, the second U. S. group to make the trip is now paying visits to the pressed metal industry here. They were feted at a luncheon held by the Sheet & Strip Metal Users Technical Assn. and then taken into the heart of the industry.

Trips are scheduled to Vauxhall Motors, Ltd.; Pressed Steel Co., Ltd.; Briggs Motor Bodies, Ltd.; Jos. Sankey & Sons, Ltd.; Rubery Owen & Co., Ltd., and Joseph Lucas, Ltd. British teams have been coming to America under the auspices of the Anglo-American Council on Productivity.

Building Cut Back in England

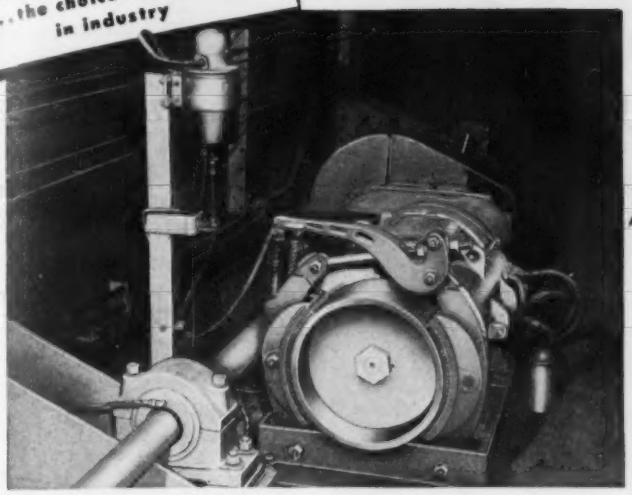
Even rebuilding of war-blitzed buildings in England will be slowed under cutbacks for both civilian and industrial building made necessary by the growing defense program. Dollar amount of the building cutback totals $300 million.

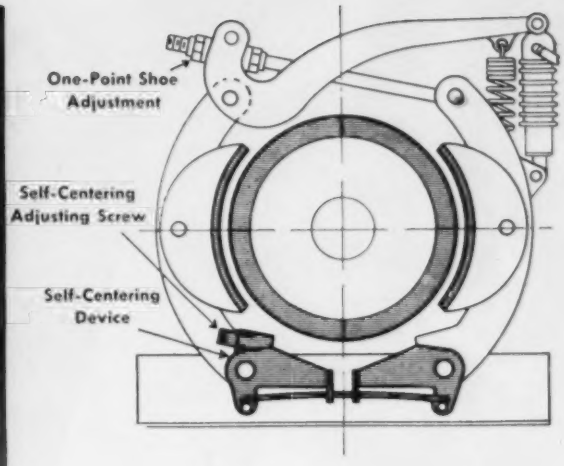
A complete and immediate ban was clamped on new office buildings, movie theaters, and entertainment buildings costing more than $14,000. Farm, school, and university building will be reduced.

Sale of Washers Drops

Factory sales of standard size household washers in May totalled 253,942 units, a drop of 13.1 pct below the preceding month and 16.6 pct from the same month last year, according to the American Home Laundry Manufacturers' Assn. Sales of automatic dryers came to 32,292 units, a drop of 2 pct from April and 100.3 pct higher than in May, 1950.

Wagner
CRANE-BRIDGE BRAKES
...the choice of leaders in industry





Only Wagner can give you all these features that mean *safe, sure stops for cranes*

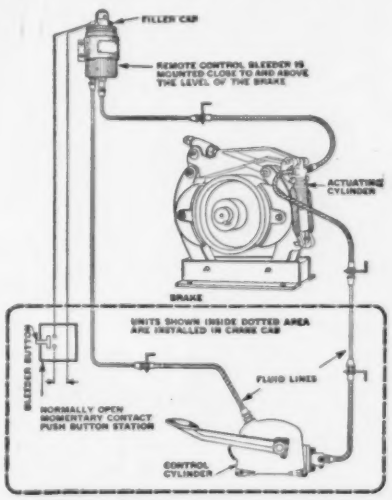
Wagner Crane-Bridge Brakes are HYDRAULIC—they let you stop your cranes the way you stop your car . . . with *full control* . . . and with utmost safety. Wagner Hydraulic Brakes provide even the heaviest steel mill ladle cranes with controlled deceleration and smooth, precise stops.

Only Wagner Hydraulic Braking Systems are equipped with the remote control bleeder that keeps the lines full of fluid and makes bleeding the system a simple "one-man one-minute" job, and only Wagner offers the self-centering device that prevents brake shoe drag by automatically assuring equal clearance of both shoes.

Other features include power failure braking, one-point shoe adjustment, 200% emergency torque, and non-scoring molded lining blocks that are easily replaceable.

You can handle any crane bridge braking application with Wagner Hydraulic Brakes—four sizes, with or without parking attachment, cover the field.

If your cranes are not equipped with Wagner Brakes, we can show you how simple it is to install a modern hydraulic system. If you still have old-style Wagner Brakes, your system can be easily modernized with our complete conversion kits. Bulletin IU-40 gives full information—write for your copy.


FILLER CAP
REMOTE CONTROL BLEEDER IS MOUNTED CLOSE TO AND ABOVE THE LEVEL OF THE BRAKE
ACTUATING CYLINDER
BRAKE
UNITS SHOWN INSIDE DOTTED AREA ARE INSTALLED IN CRANE CAB
BLEEDER BUTTON
FLUID LINES
NORMALLY OPEN MOMENTARY CONTACT PUSH BUTTON STATION
CONTROL CYLINDER

Controlled from the crane cab, the bleeder enables the operator to remove air from the fluid lines whenever necessary, simply by pressing a pushbutton and pumping the control cylinder foot pedal.

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ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

B1-1

To Discuss Metal Resources At World Metallurgical Congress

Thousands of American metallurgists will participate with top-ranking metal scientists and engineers from the free nations of Europe, Africa, Asia and South America in a discussion of metal resources of the world.

The discussion will form the World Metallurgical Congress, first international meeting of its kind, and will be held in Detroit from Oct. 14 through 19.

Walter E. Jominy, staff engineer of The Chrysler Motor Corp. and president of the American Society of Metals stated that ASM would be sponsoring the conclave concurrently with the 33rd annual National Metal Congress and Exposition. Prior to the meeting the foreign visitors will spend several weeks observing industrial, government and educational institutions to observe the scientific advances which have taken place in America during the past few years.

Approve Lead-Zinc Drilling

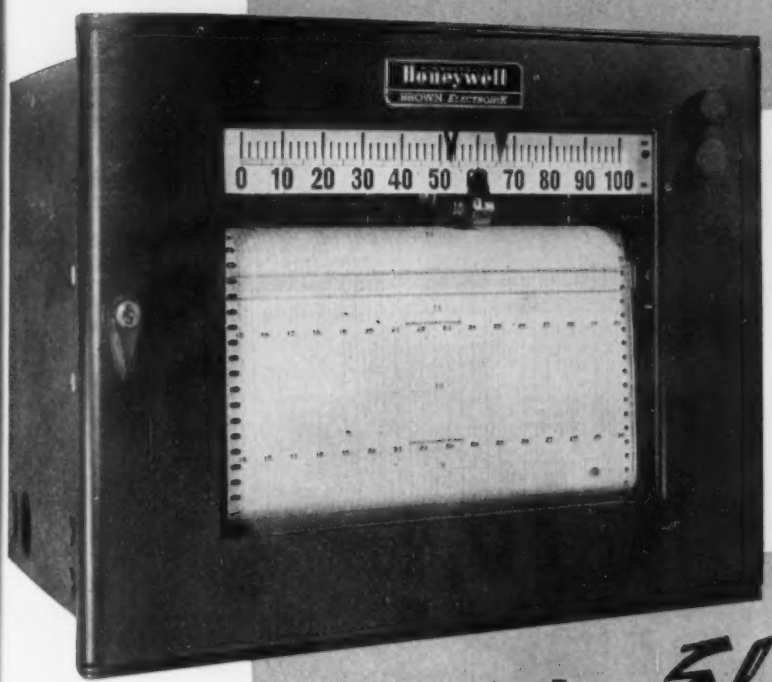
The Defense Minerals Administration has given its approval to two contracts for exploratory work on separate lead-zinc properties in Wisconsin.

In making the announcement, Paul Zinner, Bureau of Mines Regional Director, indicated that these are the first contracts approved in the upper Midwest area under the "matching fund" principle in which the government contributes a percentage of the cost in the search for new sources of strategic and criticai minerals. The government's contribution for lead and zinc is 50 pct.

Iron Company's Profits Up

Woodward Iron Company's net profit for the first 6 months of 1951 was $2,975,453 after provision for taxes on income. This is equivalent to $4.22 a share on stock outstanding. In the first 6 months of 1950 net profit was $2,541,279, or $3.60 a share after taxes at rates then in effect.

NEW EFFICIENCY FOR YOUR MULTI-ZONE FURNACE



...the ElectroniK MULTI-POINT STRIP CHART CONTROLLER

Here's the last word in multiple controllers . . . its outstanding performance is setting new standards of comparison for equipment requiring mixed types of control.

Reasons for its increasing popularity are:

• *Affords multi-point recording with a great variety of controls at same or different temperatures* • *Provides unmatched accuracy, sensitivity and speed to meet process requirements* • *Stabilizes records and control* • *Combines proportional and contact types of control* • *Conserves panel space by combining many functions in one instrument* • *Possesses all the features of the popular ElectroniK Potentiometer.*

Your local Honeywell engineer will be glad to discuss with you your particular application . . . call him today. He is as near as your phone. MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division,* 4483 Wayne Ave., Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

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Brown Instruments

THE RIGHT STEP

to increased production with Towmotor MH*

The right step to increased production and lowered costs is the light step on Towmotor's accelerator that quickly puts **M**ass **H**andling to work in YOUR plant! Loading and unloading operations speed up . . . in-plant movement of materials is swift . . . hard-to-reach storage space is used profitably as Towmotor reduces handling costs as much as 95% in America's leading industries. 12 Towmotor models, engineered for 'round-the-clock service, handle loads from 1,500 to 15,000-lbs. . . . a Towmotor for every handling job. TOWMOTOR CORPORATION, Div. 15, 1226 E. 152nd St., Cleveland 10, Ohio. Representatives in all principal cities in U. S. and Canada.

*MH is Mass Handling—the systematic movement of the most units in the shortest time, at lowest cost.

FOR COMPLETE FACTS about how Towmotor cut handling costs 95% . . . cut loading costs 75% . . . increased plant capacity 400% . . . saved 160 man-hours per week . . . write today for the latest issue of "HANDLING MATERIALS ILLUSTRATED" containing on-the-job photos!

TOWMOTOR
THE ONE-MAN-GANG
®

FORK LIFT TRUCKS and TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

HOW MANY PEOPLE HAVE YOU TALKED TO ABOUT AMERICANISM TODAY?

NIAA Chooses Apsey; Launches Advertising Research Foundation

J. F. Apsey, Jr., advertising manager, Black & Decker Mfg. Co., Baltimore, was elected president of National Industrial Advertisers Assn. at their annual convention in New York.

Vice-presidents elected were:

Gene V. Wedereit, director advertising, Girdler Corp. & Tube Turns, Inc., Louisville.

Kenneth J. Bayer, account executive, Oakleigh R. French & Associates, St. Louis.

A. R. Tofte, advertising manager, Allis-Chalmers Mfg. Co., Milwaukee.

M. Montague, commercial department, U. S. Steel Co., Pittsburgh.

Robert D. Towne, vice-president, W. L. Towne Advertising, New York, was named secretary and treasurer.

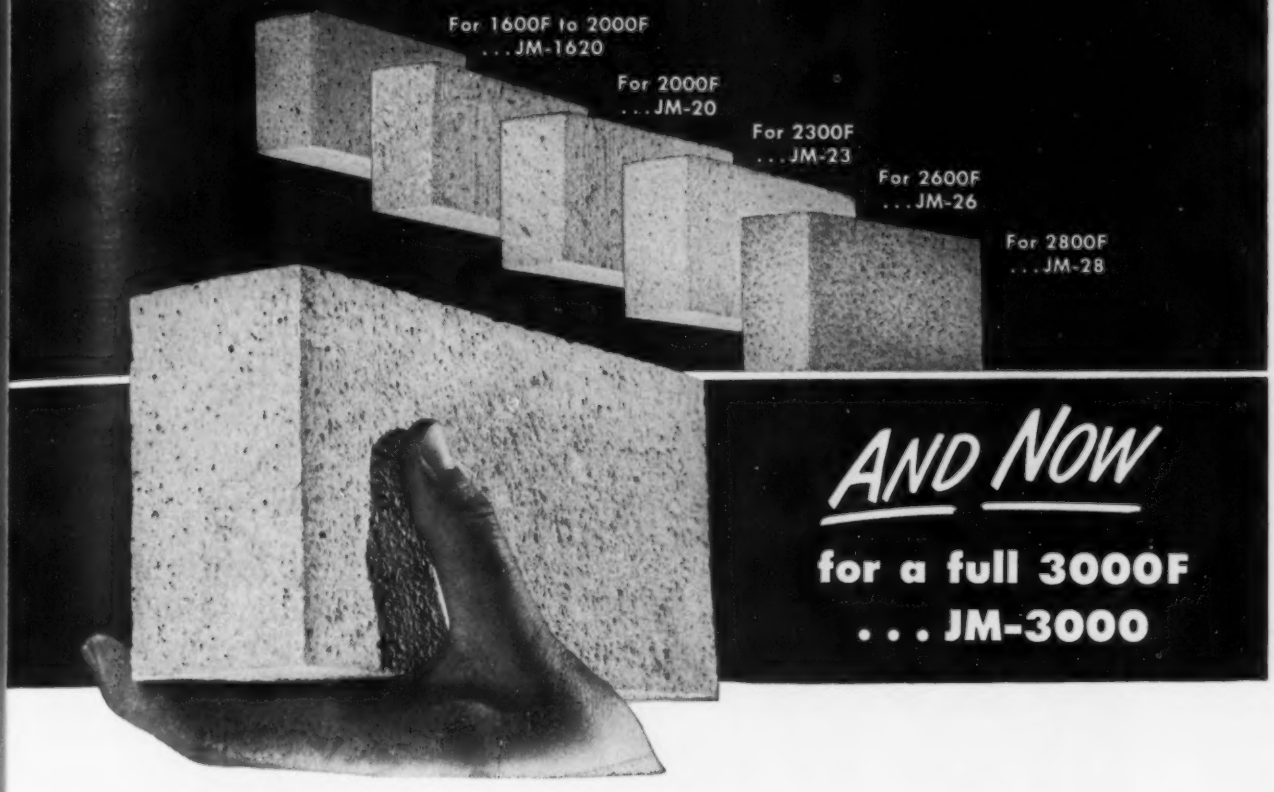
A continuing research foundation was established by the board of directors of NIAA. It is hoped that the Industrial Advertising Research Foundation will help find some of the answers long sought by advertising people. Only strings attached are that projects must have (1) broad interest among membership and (2) early practical use.

International Welding Congress

Some 500 delegates have enrolled for the first congress organized by the International Institute of Welding which opened with a government reception in London on July 14. The delegates are welding experts from 21 countries including those of Western Europe, the United States, Canada, New Zealand, India, Yugoslavia, Persia and Turkey.

The technical meetings are being held in Oxford from July 16 to 20, and include sessions on the welding of bridges and structures, the welding of wrought light alloys, and recent developments in British welding. Members of the congress will afterwards visit works and shipyards viewing operations in many parts of the country.

MEET the family of Johns-Manville Insulating Fire Brick . .



AND NOW for a full 3000F . . . JM-3000

HERE IS AN OUTSTANDING FAMILY of insulating fire brick for back-up or exposed use . . . the only family of its kind . . . that gives you a complete range . . . a *quick heating* insulating fire brick for every purpose.

By taking advantage of the quick heating characteristics of these insulating fire brick, you'll benefit through important savings in fuel because of the quicker rise to proper operating temperature in the furnace. This is a result of the low heat storage capacity and low thermal conductivity characteristics of the brick. These factors are especially important where furnaces are being intermittently operated.

The same materials can also be obtained in large size units as Johns-Manville Insulating Fireblok. This product has many advantages over the smaller size fire brick, from both a construction and stability standpoint. They can be quickly applied because they are easy to cut and fit. J-M Insulating Fireblok provide additional heat savings because they reduce the number of joints, and require less mortar for bonding.

Why not have a Johns-Manville insulation expert call to tell you more about ways in which you can save by using these insulations in your furnaces. Write Johns-Manville, Box 290, New York 16, N. Y. for further information.

	JM-1620	JM-20	JM-23	JM-26	JM-28	JM-3000
Densities, lb per cu ft	29	35	42	48	58	63-67
Transverse Strengths, psi	60	80	120	125	120	200
Cold Crushing Strengths, psi	70	115	170	190	150	400
Linear Shrinkage,† percent	0.0 at 2000 F	0.0 at 2000 F	0.3 at 2300 F	1.0 at 2600 F	4.0 at 2800 F	0.8 at 3000 F
Reversible Thermal Expansion, percent	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F	0.5—0.6 at 2000 F
Conductivity* at Mean Temperatures						
300 F	0.77	0.97	1.51	1.92	2.00	3.10
1000 F	1.02	1.22	1.91	2.22	2.50	3.20
1500 F	1.27	1.47	2.31	2.52	3.00	3.35
2000 F	—	1.72	2.70	2.82	3.50	3.60
Recommended Service						
Back up	2000 F	2000 F	2300 F	2600 F	2800 F	3000 F
Exposed	1600 F	2000 F	2300 F	2600 F	2800 F	3000 F

† *24-hr simulative service panel test for JM-3000, 24-hr soaking period for other brick.*

* *Conductivity is expressed in Btu in. per sq ft per F per hour at the designated mean temperatures.*

Note: Above tests are in accordance with A.S.T.M. tentative standards.

Johns-Manville First in INSULATIONS

THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years

PATENTED FLEXIBLE DISC RINGS

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated LUBRICATION IS NOT REQUIRED!

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

• • •

NO MAINTENANCE PROBLEMS.

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THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Ford Workers' Kids Win Education in National Contest

A total of 70 high school seniors from 14 states have won 4-year college scholarships in a nationwide competition among children of Ford Motor Co. employees.

Fifty of the winners are from Michigan; 37 of the winners are boys and 33 are girls. To be eligible for scholarships, students have to be sons or daughters of Ford employees. They must rank in the top third of their high school classes and take a competitive examination given by the Educational Testing Service, Princeton, N. J. Selections were made by the Ford Scholarship Board of college and university presidents.

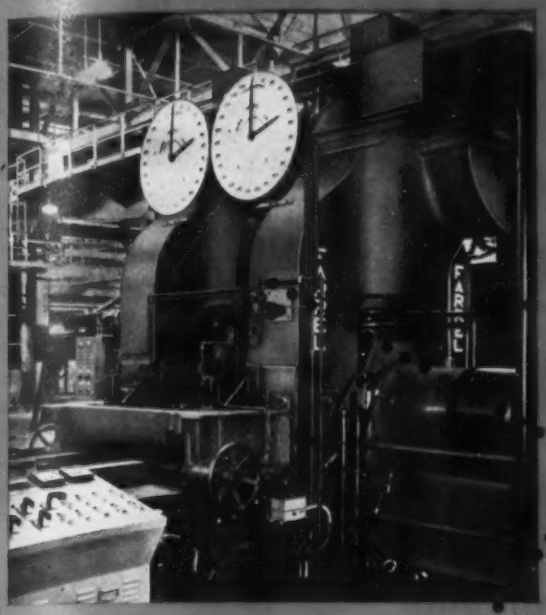
Profits Show Ups and Downs For Metals, Metalworking Fields

Considerable variation in profits made by the metals and metalworking industries in the first quarter, 1951, as contrasted with the fourth quarter, 1950, is shown in tabulations released by the Federal Trade Commission and Securities Exchange Commission.

After taxes were deducted, the primary nonferrous metal field showed a first quarter drop from $165 million to $139 million—a percentage decrease of 16. The fabricated metal industry made a quarter-year rise from $171 million to $174 million, or a 2 pct increase.

Between these extremes was the primary iron and steel industry, which showed a 2 pct loss, and the machinery field, exclusive of the electrical and transportation machinery branches, with a 1 pct gain. Dollarwise, these variations meant a drop from $257 million to $253 million for primary iron and steel, and a rise from $288 million to $291 million for the machinery industry. All figures indicate the situation after taxes.

New Record—Figures on metals industries profits and losses are included in a report covering 22 major industries, which reported an 8 pct decline in net profits be-



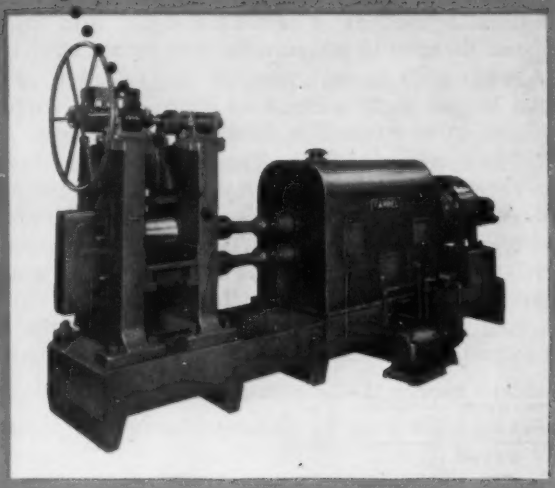
FARREL BUILDS NONFERROUS ROLLING MILLS *to suit your exact requirements*

Whether you need

A a giant breakdown mill . . .

B a tandem for producing copper rod . . .

C a laboratory unit for experimental work or any other type of mill, Farrel can build it to suit your needs exactly.



For almost a century, Farrel mills have been helping to solve rolling mill production problems. Designed to meet specific requirements, they are built in a wide range of types and sizes for rolling nonferrous rods, strips or sheets, as well as metal foils and cold strip steel. The company also designs and manufactures the reduction gear drives and pinion stands, coilers and special handling equipment required to make each installation a complete unit.

Farrel engineers are prepared to design mills for the solution of your production problems.

Write for quotations on mills for specific applications.

FARREL-BIRMINGHAM COMPANY, INC.

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Sales Offices: Ansonia, Buffalo, New York, Akron, Pittsburgh, Chicago, Los Angeles, Houston

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FB-653A

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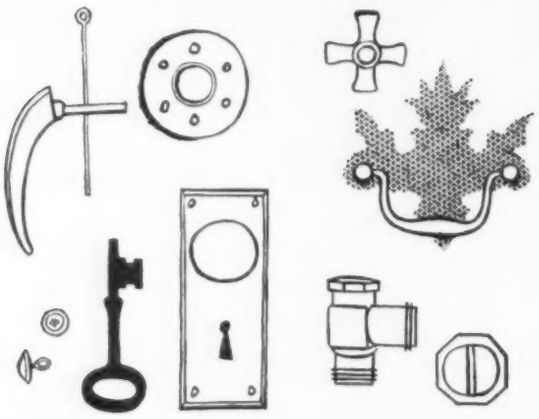
SAVE TIME AND DOLLARS!

BARREL FINISH YOUR METAL PARTS



Use the Correct Wyandotte Compound

More and more metal-finishing plants are realizing the advantages and economies of barrel finishing. And they find that when they use Wyandotte compounds, they obtain outstanding results.

Because in barrel finishing, the selection of the proper compound is just as important as choosing the correct type and size medium—or as controlling operating conditions.

The compound must suit both the work and the medium. It must take care of hard water conditions, keep media and barrels clean. And, of course, it must develop the desired finish on metal parts.

Wyandotte research and technical experience have developed barrel-finishing compounds which are widely accepted as offering superior performance at minimum cost.

Ask your Wyandotte representative to help you select one of the following products for your barrel-finishing jobs:

Wyandotte Burnek 22—for burnishing ferrous and non-ferrous metals.

Wyandotte Light Alloy No. 1—for deburring some ferrous and non-ferrous metals.

Wyandotte Burnishing Compounds 317 and 321—for deburring and burnishing some ferrous and non-ferrous metals.

Wyandotte Burnishing Powder—for deburring and burnishing ferrous metals.

"Cleaning the World"

THE WYANDOTTE LINE—products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray-booth compounds. An all-purpose floor absorbent: Zorball. In fact, specialized products for every cleaning need.

Wyandotte
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Wyandotte Chemicals Corporation
BOX 9, WYANDOTTE, MICHIGAN

Please send free copy of technical report giving information on barrel finishing.

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Street _____

City _____ State _____

tween the end of December and Mar. 31. During the first quarter of the current calendar year, a new record of $53.1 billion in net sales was made. This total is greater by more than $14 billion than net sales in the first quarter of 1950, and by almost $2 billion than fourth-quarter sales.

A greater upsurge in costs and expenses, however, caused net operating profit to decline by about 1 pct in the first 3 months of this year. Net income for all corporations surveyed, after Federal income taxes, was down to 3.3 pct, after reaching 3.5 pct in the fourth quarter, 1950.

Convert Ship for Lake Service

Conversion of a C-4 vessel for bulk freight service on the Great Lakes was announced by Hanna Coal & Ore Corp. and the Sand Products Corp. of Detroit. The vessel was acquired from the Maritime Administration.

The Hansand Steamship Corp., a newly formed company owned jointly by Hanna Coal & Ore and Sand Products, will be the registered owner of the vessel which will be ready for the 1952 shipping season. It is expected that the converted vessel will be capable of handling approximately 18,000 tons. Having an overall length of 522 ft and a 71 ft 6 in. beam, it has a molded depth of 43 ft 6 in. and a power plant of 9,000 hp.

Known as the Marine Robin, the vessel was built in 1944 by the Sun Ship Building and Dry Dock Co. at Chester, Pa.

To Tool for Aircraft Engines

Kaiser-Frazer will tool its Dowagiac, Mich., plant to produce components for Wright R-1300 aircraft engines.

According to T. A. Bedford, general manager of the K-F engine division, the Dowagiac facility will be equipped to perform 47 pct of the machining operations required on the defense project. The Dowagiac plant was previously an automotive foundry and machine shop. It was acquired by K-F in 1947.

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for urgent military and
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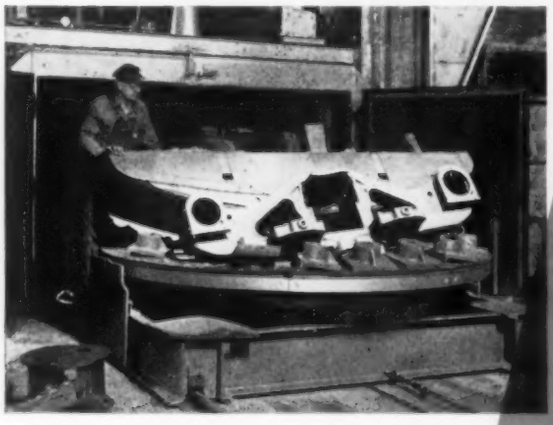
WHEELABRATOR ® ROOMS eliminate the tedious, unhygienic labor of hand blasting

Cleaning large, unwieldly castings in an airblast room is always slow, expensive and unhygienic. To overcome these handicaps, American has perfected a complete line of Wheelabrator Rooms—employing unique work handling mechanisms—whose fast, economical performance has been proved in many actual installations.

The Wheelabrator Room eliminates much of the manual labor required in airblast room operation; it provides positive exposure of the work to the abrasive barrage of one or more perfected Wheelabrator units; it eliminates the handicap of wearing protective clothing; it will handle any size work at high production speeds and at greatly reduced cost.

Write today for details on how a Wheelabrator Room can be profitably applied to your problem.



THIS WHEELABRATOR ROOM SAVES 32 MAN HOURS DAILY

A reduction of 32 man hours in direct cleaning room labor and a drastic slash in the cost of chipping and grinding were the immediate results of the installation of this Wheelabrator Room at American Hoist & Derrick Co., St. Paul, Minn.

Wheelabrator® AIRLESS BLAST CLEANING

American

OFFICES IN PRINCIPAL CITIES

AMERICAN WHEELABRATOR & EQUIPMENT CORP., 510 S. Byrkit St., Mishawaka 3, Ind.

new equipment

Continued from Page 38

Pedestal press

For use with the 17½-ton Power-Twin hydraulic puller, a new pedestal press is useful for production, assembly line or maintenance operations and may be temporarily or permanently installed near equipment to perform pulling or installing jobs. Mounting a strong, practical, open-throat press plate it provides almost unlimited vertical adjustment and can be used for pulling wheels, pulleys, bushings, collars, couplings, gears, shafts and bearings. *Owatonna Tool Co.*

For more data insert No. 13 on postcard, p. 35.

Phosphatizing compound

Only 1 to 2 min are required for a new phosphatizing process. The product called Keykote is manufactured in powder form and is used in a concentration of 1 oz per gal. It can be applied by spray or immersion. Black iron tanks are adequate and no screen is required since Keykote will not sludge out. No powder remains on the work; a rinse is not necessary. *Kelite Products, Inc.*

For more data insert No. 14 on postcard, p. 35.

Anti-fatigue matting

Called Lite Step, a new floor matting featuring anti-fatigue qualities is a combination of ⅛ in. corrugated rubber top wedded to a ¼ in. live sponge rubber base. The mat comes in all lengths and up to 72 in. wide, is said not to slip or slide on any surface, is tough and long lasting, easily washable, odor-free and resistant to most ordinary chemicals. *Ace Hose & Rubber Co.*

For more data insert No. 15 on postcard, p. 35.

Aluminum paint

A new heat resistant aluminum paint for moderately high temperatures provides a finish coat of unusual brilliancy. Suitable for both interior and exterior use and brush or spray application, it is said to resist temperature extremes, fumes, moisture, mild acids and alkalis. It sets in 3 hr and dries in 18. *Speco, Inc.*

For more data insert No. 16 on postcard, p. 35.

WESTINGHOUSE RECTIFIER WELDERS *Save* ON ANY JOB

Westinghouse D-C Rectifier Welders handle applications of *all* sizes better, faster and cheaper than m. g. sets. Field reports prove the unit is ready for tomorrow's even bigger welding jobs.

Take the 2,000,000-gallon water tank created by Pittsburgh-Des Moines Steel for the city of Niagara Falls, New York. Welding of the monster prefabricated sections was done by a unique battery of d-c rectifier units supplied by one large diesel-driven generator. This arrangement replaced separate engine-driven welding generators formerly used.

With the rectifier welders, as compared to those formerly used, fuel costs alone were slashed 70% . . . maintenance was reduced 85% . . . equipment weight was cut 15,000 pounds. Initial cost of these rectifier welders and power supply generator was 50% less than that of rotating d-c welders of equivalent capacity.

You may never have to weld a 2,000,000-gallon tank, but you can always save with Westinghouse D-C Rectifier Welders on all your applications—large or small. Call your nearest Westinghouse distributor or write Westinghouse Electric Corporation, Dept. DC-57, Welding Division, Buffalo, N. Y.

J-21609

YOU CAN BE SURE.. IF IT'S

Westinghouse

Rectifier Welders

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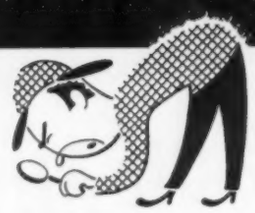
MILITARY PACKAGING?



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new equipment

Continued

Quick setting floor patches

Permanent repairs to chuck holes or breaks in concrete floors can be made easily and quickly during working hours by using Por-Rok quick setting cement. Merely clean out the hole or break, mix Por-Rok with water, and pour into the opening. Por-Rok is self-bonding, will not shrink, and requires no troweling for a perfect finish. The patch is ready for light loads in 15 min, normal trucking in 30 min. Compression strength is 4500 psi. *Hallemite Mfg. Co.*

For more data insert No. 17 on postcard, p. 35.

Flux-coated aluminum rods

Silicon-free, flux-coated aluminum welding rods for oxy-acetylene and oxy-hydrogen welding are said to provide a base metal matching solution since corrosion resistance and color, as well as physical properties of the weld, are said to closely match the aluminum. The flux coating is low melting to provide for minimum heat application and once melted, flows in a transparent pool, permitting the welder to easily watch the progress of the work. The special flux is on the alloy in the proper amount to provide for easy welding and good cleaning action. *Eutectic Welding Alloys Corp.*

For more data insert No. 18 on postcard, p. 35.

Collapsible steel box

A collapsible materials handling box can be dumped by a lift truck with revolving apron. Capable of being collapsed or erected in less than 20 sec, this Phil-Box is equipped with reinforced guide holes on all four sides for entry by the prongs of a fork lift truck and can be completely inverted without slipping off the truck. It has a capacity of 5000 lb, is self-contained without loose pins or parts, and folds down to collapsed height of 10 in. Built of heavy gage corrugated steel, it is held in erected position by a safety lock with a safety catch. *Phillips Mine & Mill Supply Co.*

For more data insert No. 19 on postcard, p. 35.

Abrasion-resistant centers

Wear and abrasion-resistant centers have a deep, solid core of M-40-U alloy, that is induction brazed into the steel shank of the center, after which the entire center is finish ground. The wear material, M-40-U, is always supported by the tough shank steel throughout the life of the center. Centers require only a cleanup grind when wear finally occurs. M-40-U centers and half-centers are available with Morse, Jarno or Brown & Sharpe taper shanks, in lengths of 3⅝ to 12¾ in. *Gorham Tool Co.*

For more data insert No. 20 on postcard, p. 35.

Machinists' vises

Malleable iron machinists' vises use a new type graphite-bronze, self-lubricating thrust bearing located at the front of the sliding jaw. This absorbs thrust of the steel screw head, provides easy and positive operation, at the same time preventing wear and eliminating end play. Because of this bearing vises can be pulled up tighter and held more securely with less pressure. The vises are made in standard sizes, 3 to 8 in. jaw width. Hardened tool steel jaw faces of T section design are pinned into the castings so they cannot come loose in use, but can be easily replaced if chipped or worn. *Columbian Vise & Mfg. Co.*

For more data insert No. 21 on postcard, p. 35.

Aircraft pushbuttons

Aircraft pushbuttons to supplement the existing line of aircraft circuit breakers are specifically designed for aircraft service in such functions as fire control, turret control, communication circuits, signal systems, and remote control of relays, solenoids and motors. Two basic types are in production: the two point, two terminal, with normally open or normally closed contacts, in a variety of flange and mounting arrangements; the three point, three terminal type with normally open contacts, with various mounting arrangements, and identification disks under Lucite cap. *Square D Co.*

For more data insert No. 22 on postcard, p. 35.

COULD ANYTHING BE MORE CONVINCING THAN YOUR OWN EXPERIENCE?
Then give HERC-ALLOY the toughest chain job in your plant. Our asking for this test reflects the confidence given us by HERC-ALLOY service records from industry's leading plants.
HERC-ALLOY
STEEL CHAIN

HERC-ALLOY is America's ***first alloy*** steel chain. For slings or other applications HERC-ALLOY Chain will prove that efficiency, safety and economy can go hand-in-hand.

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(Affiliated with Chisholm-Moore Hoist Corporation)
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Other Factories at Angola, New York, St. Catharines, Ontario and Johannesburg, S. A.

UNITCAST PRESSES

. . REDUCE FINISHING TIME—
. . GIVE MINIMUM TOLERANCE LIMITS!

Shown above are three presses ranging from 250 to 600 ton capacities, another important part of Unitcast's facilities that add quality to the product.

- **Do your castings assemble freely and within tolerance limits?**
- **Do your castings fit machining fixtures properly, consistently?**
- **Are your finish allowances held to a minimum?**

INTERCHANGEABILITY has long been recognized as the forerunner of mass production. Unitcast daily production is held to the specified dimensional tolerances, assuring you this very important advantage.

UNITCAST ENGINEERS CONTINUE TO BE AT YOUR SERVICE

UNITCAST
Corporation
QUALITY STEEL CASTINGS

Give us a chance to offer a "cast steel" answer for your parts problem. Our suggestions while your product is in the design stage will pay continuous dividends. Write or call today. Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. *In Canada:* Canadian-Unitcast Steel, Ltd., Sherbrooke, Quebec.

UNITCASTINGS ARE FOUNDRY ENGINEERED

new equipment

Continued

Automatic liquid blender

A new automatic proportioning system for blending two or more of a wide variety of liquids uses no charts or calculations to set the blender for any combination of liquids. Simple controls on each meter permit instantaneous setting of ingredient proportions in increments to meet customers' exacting needs. Total throughput is recorded on a master counter and each ingredient is recorded separately on its own meter. Failure of any ingredient supply automatically shuts off the entire system and if the supply to any meter slows down for any reason, all meters synchronize automatically to the same rate of delivery. *Bowser, Inc.*

For more data insert No. 23 on postcard, p. 35.

Fuel scavenge pump

An integrally assembled fuel pump and electric motor used in refueling aircraft removes all fuel from the manifold after a refueling operation or transfer of fuel has been accomplished. Equipped with a 27 v dc motor, the pump is designed to deliver at least 100 gph at 3500 rpm, 5 psi discharge pressure at 17,000 ft altitude. The same pump is available with an ac motor of 115 v, 400 cycle, which has a capacity of 150 gph at 4000 rpm and 5 psi pressure. Rotary vane pump has 0.179 cu in. displacement per revolution. *Romec Div., Lear, Inc.*

For more data insert No. 24 on postcard, p. 35.

Flame failure safeguard

To provide flame failure protection and programming control for automatic commercial and industrial gas or oil burners and for combination gas-oil burners, an all new Fireye System supervises burner operation. It consists of a Programming Control and Firetron Scanner. The latter is compact and "sees" and checks the pilot flame and the establishment of the main flame, with positive and instantaneous response. *Combustion Control Corp.*

For more data insert No. 25 on postcard, p. 35.

Chromate coating process

Low cost and ease of operation are claimed for a new process for producing chromate coatings on zinc and cadmium. The process, applicable for both zinc plate and zinc base die castings, uses 1 to 2 oz of salts per gallon of water. The mixture is operated at room temperature, and after immersion for a few seconds, an adherent, chromate coating is produced. No elaborate means of control are necessary. Salt spray resistances on zinc plate are over 200 hr; on cadmium plate, over 500 hr. Various colors can be applied to the coatings by means of suitable dyes. Enthox is sold as a powder mixture. *Enthone, Inc.*

For more data insert No. 26 on postcard, p. 35.

Precision packings

Molded packings for hydraulic and pneumatic equipment are compression molded under heat and high pressure from special fabric and neoprene compound that has unusual wear qualities and resistance to a wide variety of hydraulic fluids. Cup, flange, U ring and O ring designs are available. *Periflex, Inc.*

For more data insert No. 27 on postcard, p. 35.

Stud welding maintenance

Because stud welding equipment is both electric and mechanical it requires specialized preventive maintenance which is often beyond the immediate knowledge of the plant maintenance crew. KSM offers a programmed plant maintenance service designed to keep stud welding equipment functioning properly. The only charge is for shipment and replacement of parts. *KSM Products, Inc.*

For more data insert No. 28 on postcard, p. 35.

Powdered hand soap

Suitable for use in washroom dispensers or packaged in handy containers, Sopec is reputed to combat industrial dermatitis. It is also described as hygienically safe, nonabrasive, soothing, fast acting and economical. Sopec is furnished in 6-oz containers, 5 lb fiber packages, and 170 lb fiber drums. *Speco, Inc.*

For more data insert No. 29 on postcard, p. 35.

Resume Your Reading on Page 39

Ⓑ Special Ladder Bolt

Won't let you down...whether it's of wood or metal fabrication there's a place for Ⓑ Special fasteners. Many wooden products such as ladders, chairs, beds and tables get their strength from the Ⓑ line of bolts. Your problems cheerfully become ours when it comes to special bolts and headed rods.

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Lowest to highest magnifications. For plates and films 3¼ x 4¼ inches... 35mm. with the Leica Camera... black and white or color. Aristophot features include mirror reflex housing; time and instantaneous shutter; low power stage with focusing motion. The Ortholux gives you built-in illumination; large, square built-in mechanical stage; combined, inclined binocular observation and monocular photographic tube; mirror system, permitting use of vertical illuminators and Leitz Ultropak.

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CHALLENGE
Precision
SURFACE PLATES
FOR
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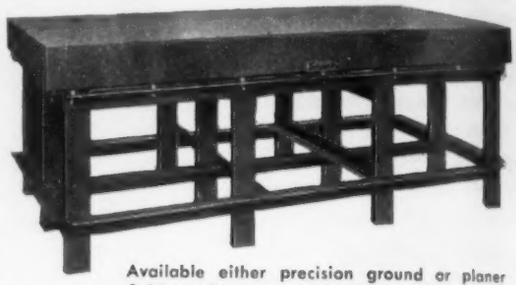
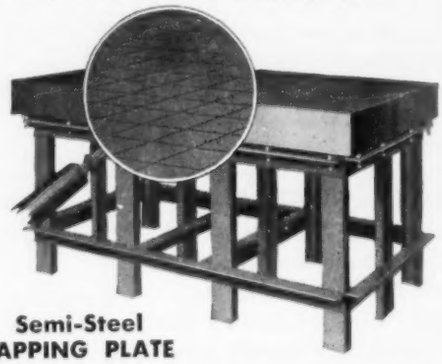
• INSPECTION
• CHECKING
• LAPPING
• ASSEMBLY
• WELDING

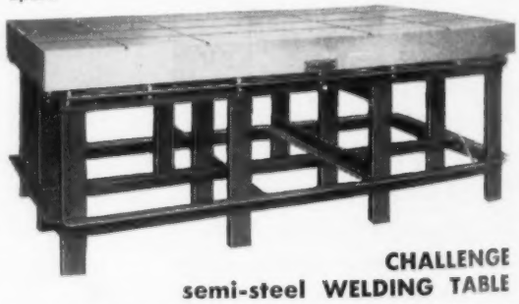


Available either precision ground or planer finished, Challenge Layout Surface Plates offer a perfectly smooth, square surface for layout, inspection or assembly line operations. Sizes range from 12" x 18" to 54" x 144". All are built of special analysis semi-steel. The all-steel stand is arc-welded to furnish the rigidity of a one-piece unit. Special leveling screws enable the user to level the plate quickly and to lock it securely.



Semi-Steel
LAPPING PLATE

For Accurate Lapping of Delicate Joints. Assures perfect fit when lapping metal-to-metal joints on which no sealer is used. Ideally suited for use on parts which must be lapped perfectly to avoid oil leaks. Plates have 1/16" grooves ½" apart.



CHALLENGE
semi-steel WELDING TABLE

The Challenge Welding Table illustrated above provides a true, rigid surface with Tee-Slots to facilitate assembling, locating and welding. It is built of fine grain special analysis semi-steel in three standard sizes: 30 x 60", 48 x 96", and 54 x 144"; other sizes to order. 682

THE CHALLENGE MACHINERY COMPANY
Office, Factories and Show Room ... Grand Haven Michigan

Challenge

Finishing Building with Boiler Plant in left background

FROM REPORTS . . . *to Producing Plant*

For Lever Brothers Limited, Stone & Webster Engineering Corporation prepared a series of reports covering alternative plans for consolidation and expansion of the company's manufacturing facilities in Toronto.

The resulting new plant facilities, selected to achieve more efficient and economical operation, were designed and constructed by Stone & Webster Engineering Corporation.

Left to right, Boiler Plant, Glycerine Refinery and Finishing Building which includes manufacturing equipment for soap products and toilet preparations.

STONE & WEBSTER ENGINEERING CORPORATION

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Cap Screws • Set Screws • Milled Studs

Specialization at "Cleveland Cap" guarantees closer attention to accurate production, rigid inspection, and prompt shipment (as conditions permit). Our capacity is concentrated on standard Cap Screws in an unusually wide range of sizes—all popular heads; square head Set Screws, and Milled Studs. We also have capacity for producing your special design headed and threaded parts by cold extrusion. See your jobber for *standard* items; write us about your "specials."

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Warehouses: Chicago • Philadelphia • New York • Providence

CLEVELAND *Top Quality* FASTENERS

originators of the Kaufman DOUBLE EXTRUSION Process
Ask your jobber for Cleveland Fasteners

publications

Continued from Page 35

Industrial brushes

The almost universal acceptance of industrial wire brushes for abrading, cleaning, preparing and finishing of metals is the subject of an interesting 32-p. book. Illustrations and descriptions of typical cleaning operations in which wire brushes are used are presented. *Pittsburgh Plate Glass Co., Brush Div.*

For free copy insert No. 36 on postcard, p. 35.

Spectrometer

The Quantometer, a direct reading spectrometer capable of giving complete and accurate analyses of brass and bronze alloys in a few minutes, is described in a new booklet, *Control—the Key to Improvement in Quality Products.* Use of the machine for production control in the selection of raw materials prior to alloying is described. *Titan Metal Mfg. Co.*

For free copy insert No. 37 on postcard, p. 35.

Hydraulic press

Assembling, drawing, broaching and other press operations requiring the high power and smooth action of a hydraulic press are speeded with a new 20-ton press. Described is a vane type hydraulic pump which delivers a smooth, steady flow of power. The double-acting cylinder makes the press equally suitable for pull broaching and numerous other operations. *Ross & Co.*

For free copy insert No. 38 on postcard, p. 35.

Wheels

"Tool Steel Process" wheels are described and illustrated in a new 8-p. booklet. Wearing surfaces of track, sheave, brake and other commonly used industrial wheels are converted in this process from low carbon to a high carbon content approximating physical properties of tool steels. Resulting longer life is a factor in lower maintenance costs. *Tool Steel Gear & Pinion Co.*

For free copy insert No. 39 on postcard, p. 35.

Pressure generator

Hydramite, a new rugged hydraulic pump capable of delivering up to 5000 psi is the subject of a new 4-p. folder. The pendulum action pump, which serves as a pressure generator, embodies a new radial piston, and is designed to overcome numerous problems connected with fluid power. *American Engineering Co.*

For free copy insert No. 40 on postcard, p. 35.

Cylinders

Hanna low pressure air cylinders, and Hanna hydraulic cylinders are described in two new booklets. Valuable engineering information on the application of low pressure and high pressure cylinders is presented. Working mechanisms of the cylinders and practical applications are explained. *Hanna Engineering Works.*

For free copy insert No. 41 on postcard, p. 35.

Shear, punch, coper

The Kling combination shear, punch and coper is the subject of a new 12-p. booklet. Built to rigid specifications, the machines offer flexibility and economy in many operations. Construction and operation of the machine are explained in some detail. Capacities and specifications relate equipment to individual production problems. *Kling Bros. Engineering Works.*

For free copy insert No. 42 on postcard, p. 35.

Bulldozers

Bulldozers, horizontal presses with long stroke and accessible die area, are described in a new 4-p. leaflet. Typical machines are illustrated. General data on construction of the machines and detailed performance and capacity information on both the single and double geared series is presented. *Williams-White & Co.*

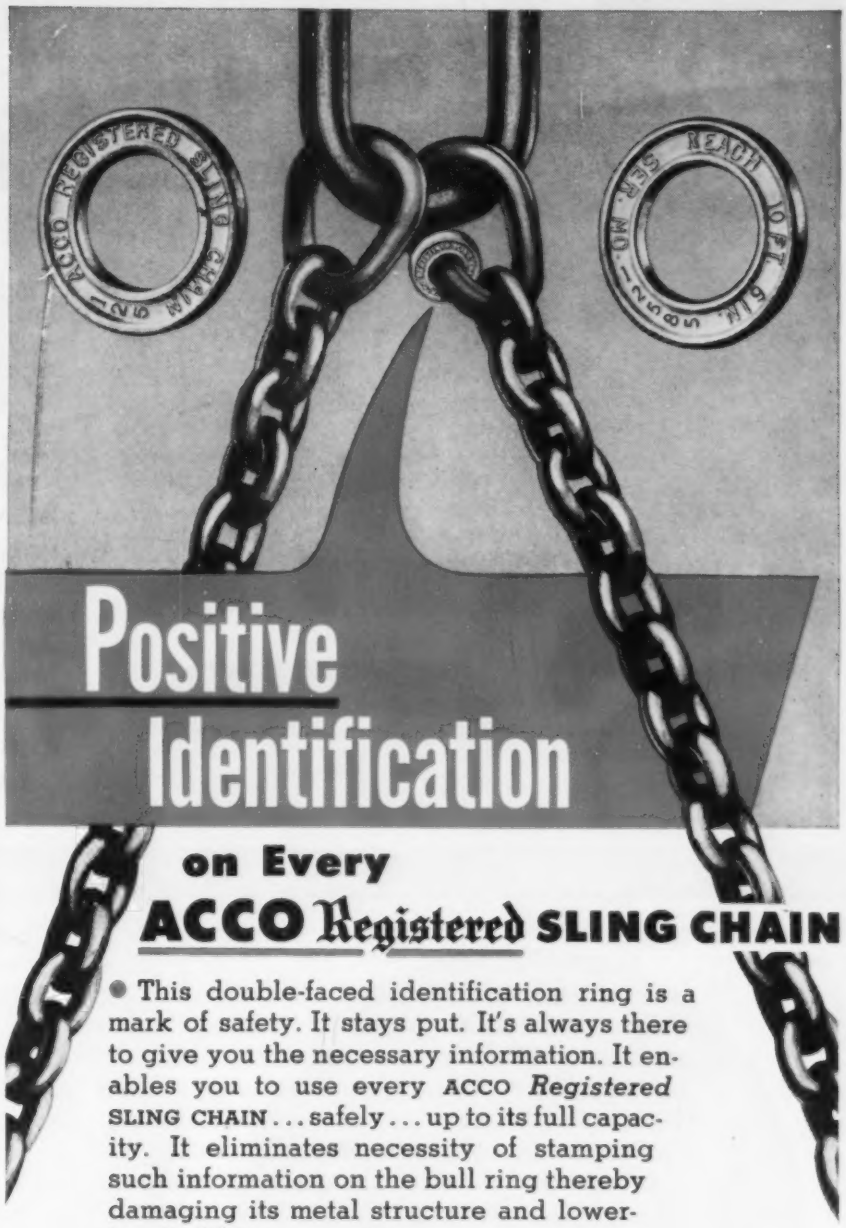
For free copy insert No. 43 on postcard, p. 35.

Temperature conversion

A handy temperature conversion chart which nimbly jumps from Fahrenheit to Centrigrade and back again has been made available. Back of the chart carries a description of the Stevens line of thermostats. *Stevens Mfg. Co.*

For free copy insert No. 44 on postcard, p. 35.

Turn to Page 166



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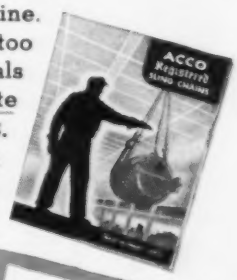

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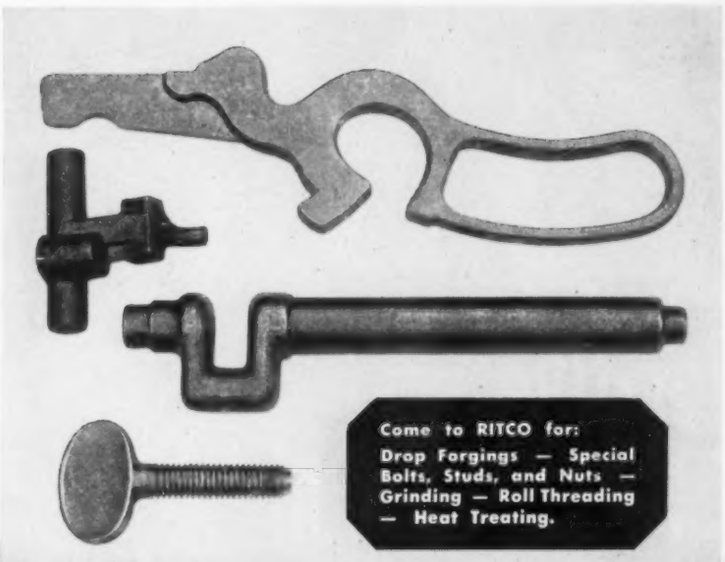

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Ritco Bright Finish Drop Forgings are clean, smooth, and accurate. They are free of flash —require a minimum of machining before assembly into your product. Ritco Drop Forgings can be supplied in ferrous and non-ferrous metals in weights from ¼ lb. to 15 lbs. Send blueprints for free estimates.

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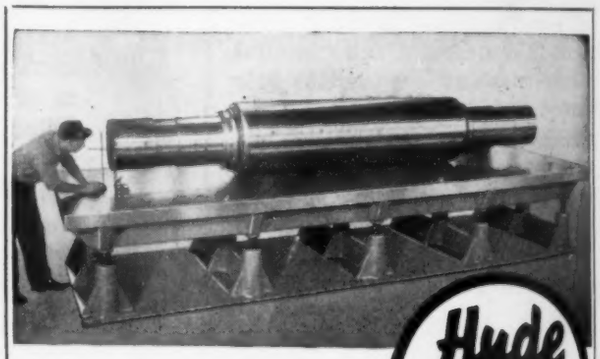

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Unit illustrated brazing carbide tips to cutting tools. Shanks up to 1½" square can be satisfactorily brazed.

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Conveniently operated on bench or table—no mounting necessary.

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BRAZING, SOLDERING HARDENING, ANNEALING DRAWING AND MELTING

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$870.00 f.o.b. factory

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⅛" steel rod 1" length in approx.	1 second
¼" " " " " "	3 seconds
½" " " " " "	15 seconds
1" " " " " "	60 seconds

Will melt 4 ounces of brass or steel in 4 minutes.
Equally well suited for heating of non-ferrous metals.

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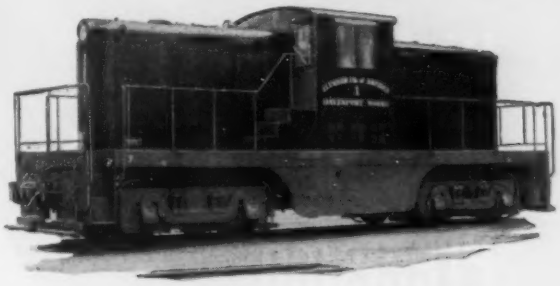
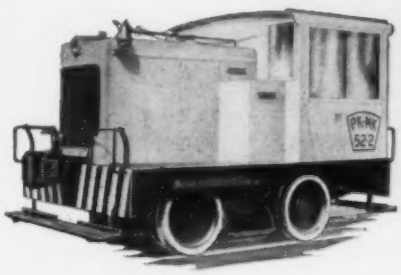


we SUGGEST *to* YOU



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or MECHANICAL
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It will be a pleasure to receive a description of your haulage conditions and work to be done. Our engineers will study your problem and recommend the size and type of locomotive that will assure maximum work at minimum expense. Such recommendation will not obligate you in the least.

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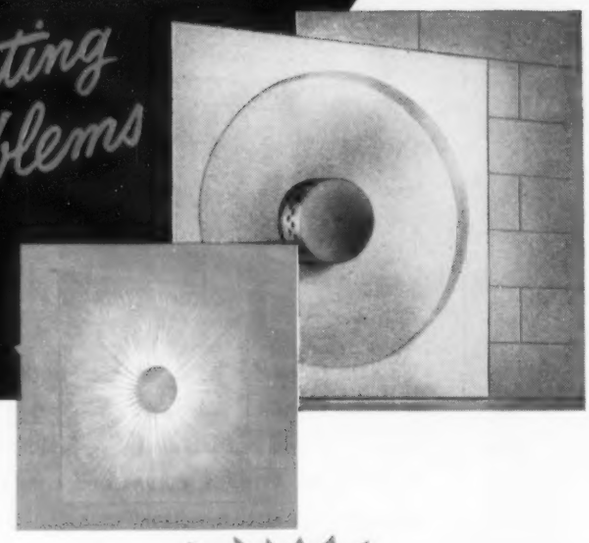
Heating Problems



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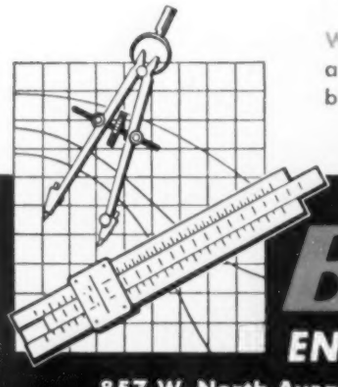
High Thermal Release

A unique precision burner for specialized high speed heating applications, the Bloom HTR Burner is ideal for use where fast heating and intense concentration of heat are needed. It will release up to 750,000 Btu per cubic foot of combustion volume. Turndown ratio of greater than 10 to 1 permits low input for holding purposes. Can be used with either gas or light oil.



WRITE for bulletin giving full details and description of this remarkable burner.

BLOOM
ENGINEERING CO., INC.
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publications

Continued

Conveyer systems

Simplicity and long life are advantages of the Rex Table Top chain conveyer system described in a new 20-p. booklet. Typical applications in industries where clean, smooth operation is a must are described. A feature of the chain is the ease with which it may be taken down and moved to new setups. Valuable engineering data is also included. *Chain Belt Co. of Milwaukee.*

For free copy insert No. 45 on postcard, p. 35.

Punches

Pivot punches are the subject of a new 8-p. booklet describing specifications, styles and applications of this type tool. Styles include Whipsleeve, straight and cylindrical ground high speed steel and cylindrical ground carbon steel alloy. Factors which add to tool-life, important in lowering press costs, are discussed. *Pivot Punch Div. of Pivot Punch & Die Corp.*

For free copy insert No. 46 on postcard, p. 35.

Switches

Cam Master switches are described in the latest EC & M Accelerator bulletin. The "off" position of the switch has a distinct feel. Like the automobile gear-shift lever, there's a contrasting change between speed-points and when the lever goes into neutral. Also described are switches for under voltage protection and hazardous locations. *Electric Controller & Mfg. Co.*

For free copy insert No. 47 on postcard, p. 35.

Treaded belting

Leather belting designed with a tread for higher contact tension in power transmission, is described in 16-p. booklet. Various industrial applications of the belt are pictured. Belt maintenance, frequently a problem where leather belting is used, is described in detail. Belt formulae and a handy chart correlating hp and rpm are included. *E. F. Houghton & Co.*

For free copy insert No. 48 on postcard, p. 35.

Resume Your Reading on Page 36

IRON AGE *markets and prices*

market briefs and bulletins

floods shut openhearths—Openhearths at the Kansas City works of Sheffield Steel Co. were ordered shut down last Friday as a result of the flooding Kansas and Missouri rivers. Steel production was permitted to resume Sunday midnight after waters began to recede. Resumption of finishing operations began shortly after. No official estimate has yet been made of the amount of steel production lost.

aluminum's aluminum shortage—At the request of DPA Administrator Manly Fleischmann, Alcoa will leave the lower six floors of its 30-story aluminum sheathed office building, in Pittsburgh, unfinished until aluminum is in better supply. The upper floors will be finished with architectural aluminum set aside many months ago.

Chrysler may close—A Chrysler executive, I. T. O'Brien, testifying at the current Detroit hearings (see page 128), stated Monday that the company cannot operate efficiently with only a few days' steel inventory, and might even be forced to shut down in September because of the shortage.

greater ore movement—Iron ore movement on the Great Lakes during June totaled 13,166,130 gross tons, a new record for the month. The best previous June was in 1942 when 12,625,102 gross tons were moved. Cumulative ore volume as of July 1 was 32,041,699 gross tons, well ahead of 1950 when the season was late in starting, and just under 1949 when the opening was unusually early.

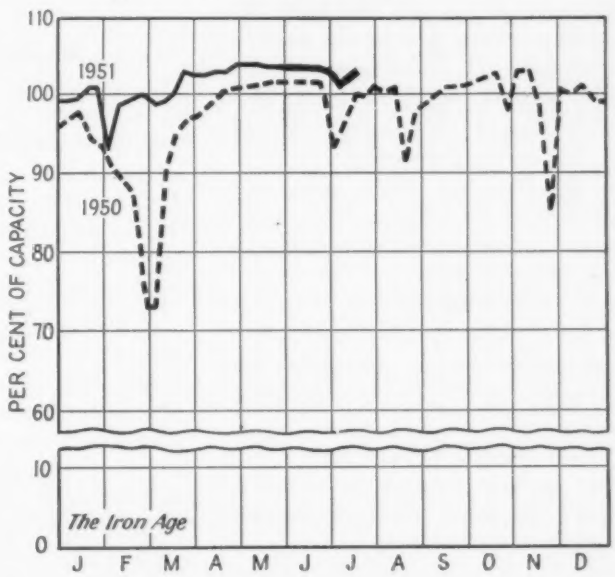
business activity up—Business activity continued to increase in the Chicago area during May with new records being established in many categories. Steel output during the month came to 1,672,500 net tons, the highest point yet reached by Chicago mills.

dim future—Detroit bar deliveries are fading daily and it is said in Chicago that nickel steel is unavailable—priority or not. General Motors Corp. has hopefully laid fourth quarter plans on the basis of no further cuts in allowable car and truck production. If GM really believes this the company stands in a minority.

buy steel plant—Ohio River Steel Corp. is being taken over by Universal Laboratories, Inc., in a stock transaction. Final moves are waiting approval of stockholders of both firms. The 144,000-ton-a-year steel mill at Toronto, Ohio, was originally owned by Follansbee Steel Corp., then by Kovalchick Industries before coming to its present owners.

conversion dead?—Some quarters say the increase to 95 pct on ingots, blooms, billets and slabs has doomed conversion. One company, a former conversion ingot supplier, lost them by directive for conversion to tube rounds and gets them back for final fabrication. Another, which bought open market ingots for conversion to barter products, has lost its source.

Steel Operations †



District Operating Rates—Per Cent of Capacity †

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
July 8	98.5*	106.0	102.0*	101.0	104.0	104.0	95.0	102.0*	97.0*	99.0	94.0	90.0	40.0	101.5
July 15	99.0	106.5	102.0	101.0	110.0	104.0	96.0	103.0	97.5	99.0	94.0	97.0	84.0	102.0

† Beginning Jan. 1, 1951, operations are based on annual capacity of 104,229,650 net tons.
* Revised.

nonferrous metals

outlook and market activities

by R. Hatschek

NONFERROUS METAL PRICES

	July 11	July 12	July 13	July 14	July 16	July 17
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.06	$1.06	$1.06	....	$1.06	$1.06*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

*Tentative.

Note: Quotations are going prices.

Aluminum Output Steady—The aluminum industry produced 135,440,954 lb of primary metal during the month of May. This compares with 135,402,337 lb produced in the previous month and maintains an annual rate of over 1.6 billion lb for the year to date. Sheet, plate and foil shipments dipped slightly in May while shipments of permanent mold rough castings scored an increase, according to the Aluminum Assn.

Making the aluminum picture even brighter is the fact that Reynolds Metals Co. is now operating 50 million lb per year of new capacity at Jones Mills, Ark., and Troutdale, Ore. The new facilities, first to be activated in the industry's current expansion, went into production about 3 weeks ago and Reynolds is planning a formal ceremony to celebrate the occasion on July 20 at Jones Mills.

Inco Boosts Production—Also putting new production facilities into operation is International Nickel Co. A previously announced expansion program by the company has been completed well ahead of schedule and monthly output has risen 1 million lb to 21 million lb a month as a result. Production now stands at the highest peacetime rate in history.

Copper Not as Bright—On the other hand, copper production in June dropped substantially, according to Copper Institute figures. Crude output in the U. S. and outside the U. S. each dropped almost 10,000 tons to 79,884 tons and 105,483 tons, respectively. Refined production was also off for the month. Refined stocks at the beginning of this month remained at about the same levels.

Tin Developments — General Services Administration last week took another step in the government's actions to bring down tin prices by informing Dutch and Belgian tin producers that the U. S. will take only 100 tons of tin from them during the second half at prices not to exceed $1.03.

These producers may or may not elect to sell this token quantity to the U. S. and at press time the issue was still undecided. The Far East market stood at the New York equivalent of just under $1.09 last Saturday and things were quietly awaiting the Dutch and Belgian decisions. It is believed that the world tin prices will probably drop some more.

M-16 Revised—Effective Aug. 1 the revised M-16 order places all copper raw materials under government allocations. Copper refiners and scrap dealers will be the only ones not requiring the NPA nod on certain of the copper and brass scrap items covered in the order. (See *Controls Digest.*)

Mercury Tone Down—Though there has been no change in the price of the metal, demand for mercury has softened somewhat. Several domestic producers are out of the market because of unfavorable ceilings under the price freeze and the Europeans do not seem too anxious to make sales.

More Washington Delays—National Production Authority last week informed lead producers that the effective date of lead allocations had been put off for a month to Sept. 1. The original issuance date was to have been last Friday but it is now supposed to come out this week. Coming this late, NPA said it would be impossible to process all the forms necessary to the administration of the order.

Lead producers have been instructed to continue booking orders in the current system with 20 pct for DO rated orders and 5 pct reserved for the government set-aside. What happens is that lead users and producers will have to work at a fantastic pace because the government could not.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Steel: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 56.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63-S-T-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.24 x 28 in., 72 in., $1.379; 96 in, $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢ 0.22 to 0.25 lb, 5.9 in., 59.3¢ 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb, ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to $0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b.. mill)

	"A" Nickel	Monel
Sheets, cold rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	40.18	....	39.78
Copper, h-r	....	36.03	....
Copper, drawn	....	37.28	....
Low brass	38.47	38.16	....
Yellow brass	37.28	36.97	....
Red brass	38.86	38.55	....
Naval brass	42.27	36.33	37.59
Leaded brass	....	....	35.86
Com'l bronze	40.18	39.87	....
Mang. bronze	45.77	39.80	41.36
Phos. bronze	59.42	59.67	....
Muntz metal	40.28	35.84	37.09
Ni silver, 10 pct	48.26	50.59	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$210-$213
Nickel electro, f.o.b. N.Y. warehouse	59.58
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.06
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.25
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	47.50
No. 215	44.50
No. 245	37.00
Yellow ingot	
No. 405	25.50
Manganese bronze	
No. 421	32.75

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	21.2
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy	20.8
ASX-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.00
Grade 2—92-95%	17.75
Grade 3—90-92%	17.25
Grade 4—85-90%	16.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39½
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow Brass	19⅛	17⅞
Red brass	20¼	19⅝
Comm. bronze	20½	19¾
Mang. bronze	18¾	18
Brass rod ends	18⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	15.50

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	19.50
No. 1 comp. turnings	19.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	15.50
Aluminum	
Mixed old cast	9.75
Mixed new clips	11.00
Mixed turnings, dry	9.50
Pots and pans	9.25

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17¼—17¾
Light copper	16 —16½
New type shell cuttings	16 —16½
Auto radiators (unsweated)	15 —15½
No. 1 composition	19 —19½
No. 1 composition turnings	18¾—19¼
Unlined red car boxes	17¾—18¼
Cocks and faucets	16¼—16¾
Mixed heavy yellow brass	13½—14
Old rolled brass	15 —15½
Brass pipe	16 —16½
New soft brass clippings	16 —16½
Brass rod ends	17 —18
No. 1 brass rod turnings	16 —17

Aluminum

Alum. pistons and struts	7½— 8
Aluminum crankcases	7½— 8
2S aluminum clippings	10½
Old sheet and utensils	7½— 8
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	10 —11

Zinc

New zinc clippings	12¼—12½
Old zinc	9 — 9¼
Zinc routings	5¾— 6
Old die cast scrap	5¾— 6

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	14 —14½
Battery plates (dry)	9½—10

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	85 —90
No. 1 pewter	60 —65
No. 1 auto babbitt	48 —50
Mixed common babbitt	16¼—16½
Solder joints	23 —24
Siphon tops	48 —50
Small foundry type	20½—21
Monotype	18¼—18½
Lino. and stereotype	17½—18
Electrotype	15 —15½
Hand picked type shells	8¾— 9
Lino. and stereo. dross	8¾— 9
Electro. dross	5 — 5¼

SCRAP *iron and steel*

markets prices trends

Cast scrap supply better, demand drops . . . Vacations, cutbacks cutting plant scrap output . . . Inventories still fall.

Major scrap centers throughout the country report little change this week and things are continuing in a relatively quiet manner. The pep that was cut out of the trade by the Fourth of July holiday seems to be staying out and brokers anticipate generally slow conditions throughout the remainder of the month.

Demand for cast grades of scrap has fallen off in all areas—probably because foundries were able to build up better inventories of material during their 2-week vacation break earlier this month. This material is still moving to most foundries but it is reported that it is easier to get and purchasing agents are carefully looking over the quality of the iron they are buying.

The tight inventory situation of the openhearth mills still continues with some of the mills down to less than a week's supply. Steelmen are extremely worried about their rate of production for this coming fall and winter when scrap operations will drop off with the weather.

Detroit reports a dwindling in scrap generation as car production drops lower and lower. Dealer scrap in that area is expected to come under government allocation soon.

Plant vacations continue to cut into industrial scrap generation and August shipments are expected to decline as a result. This is being felt in all districts and it is adding to the steelmen's worries for the future.

Very little is being heard on the government's scrap collection drive but it is reported that smaller New England communities are pitching in with high activity. Very little, however, is being done in the larger cities there. Middle western collections have been hit hard by the serious floods in that section of the country.

PITTSBURGH — The demand-supply picture shows little change. With many scrap generators shut down this month for vacations, the outlook for August when this material would normally be flowing in is discouraging. The mills have been able to do little better than keep even on inventory.

CHICAGO—Scrap movement in the area continues to improve and mills are able to improve inventory positions slightly but not enough to make any significant difference in the gloomy outlook for next fall and winter. One medium sized mill is reported to have stopped purchasing blast furnace scrap until September. The Gary and South Chicago works of the U. S. Steel Co. are still down to 6 and 9-day supplies respectively. Lack of government allocations in sufficient volume and the stepped up use of scrap keep the inventories of both plants hovering at these levels, according to trade sources.

PHILADELPHIA—The scrap market in this district showed practically no change from the previous week. Brokers here feel that the lull that set in during the holiday week will prevail throughout the month of July. Mill receipts of open hearth material dipped as a result of the Fourth of July cut in scrap operations but it was reported that mill squawks weren't too loud. Yard operations are also slow and demand for cast grades remains comparatively low.

NEW YORK—The hot weather seems to have cut some of the zip out of the scrap market here but it may also be vacations and the result of the continued peace talks at Kaesong. Foundries are back on the job now after their vacation shutdowns and the 2 weeks off seem to have given them time to build a little inventory. Cast is still moving but it is easier to buy and buyers are carefully looking over the quality of the material.

DETROIT—With auto production contracting steadily the volume of scrap generated here is declining. The shrinkage comes at a time when electric furnace users are particularly hard hit for scrap and openhearth mills, too, are scraping the bottom of the barrel. Reports persist here that Detroit dealer scrap will come under government allocation. Outstate dealers were brought under allocation a week ago. There has been no noticeable effect here as yet of the government drive to bring out more scrap metal.

CLEVELAND — Some yards are complaining about the light trickle of scrap they are receiving. Shipments are off considerably. In the Valley one mill has delayed starting up an openhearth furnace just relined because of this low inventory position. Under more normal conditions this furnace would be back in operation. Demand for foundry grades is easier.

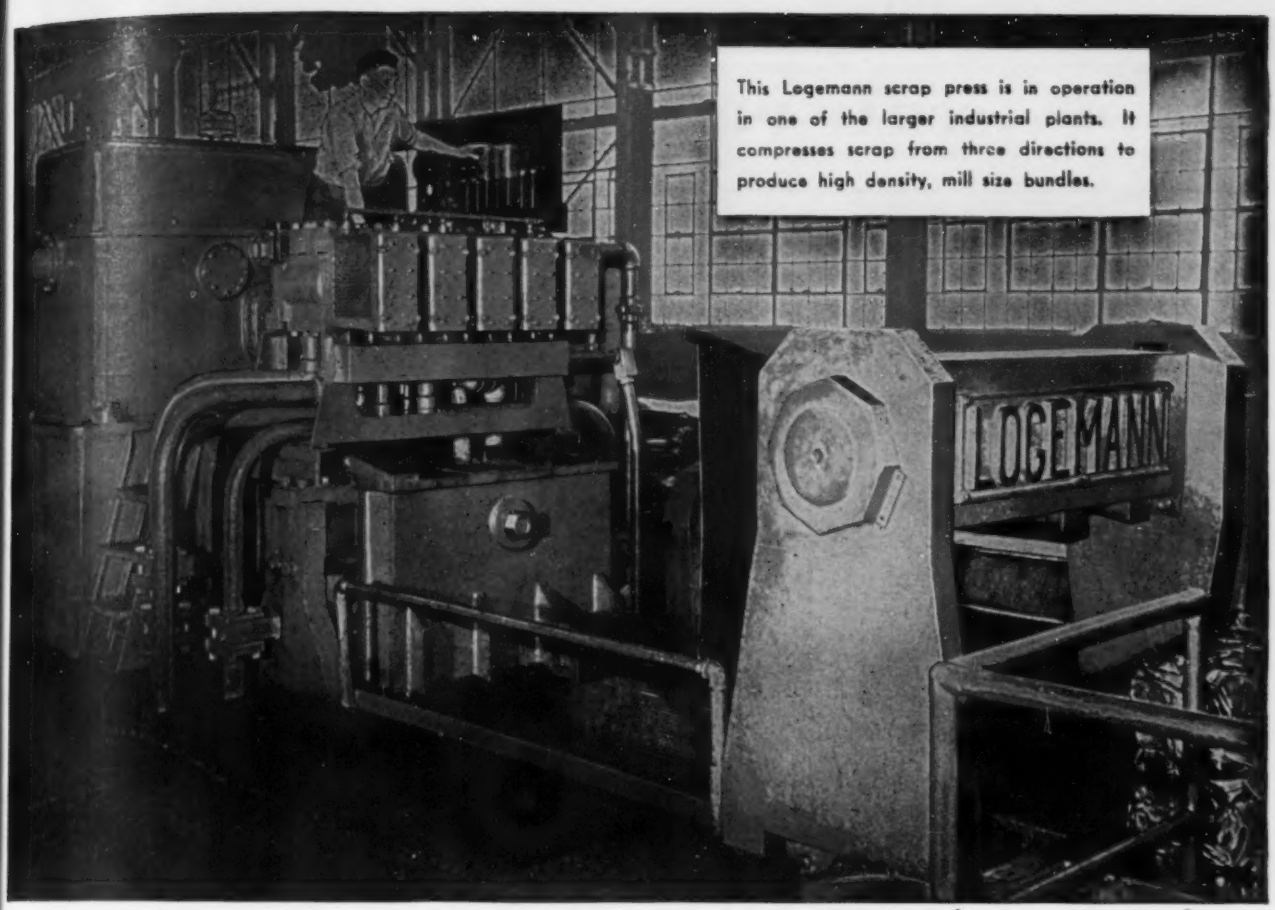
ST. LOUIS—Floods in industrial sections of Missouri have virtually shut off the movement of scrap iron to St. Louis, and until the waters recede, shipments will be limited. Consumption of heavy melting grades continues at a high level and is being drawn from dwindling inventories. Although there has been no change in prices, offerings of cast iron are moving slowly, easing the market.

BIRMINGHAM—The cast scrap situation is in good condition here and all users of this type of scrap apparently are getting just about all they need. Steel mills, however, say the scrap steel situation still is very tight, with just enough coming into the district to keep them supplied from day to day.

CINCINNATI—Pressure for foundry scrap has diminished, although good scrap can always find a home. Evidently the foundries have been able to build up their inventories with more success than the mills. One producer is reported to be down to a 2-day supply.

BOSTON—Cast iron scrap has become increasingly scarce although all sources report continued good activity in all other types. Throughout the New England area scrap drives are being fostered in the small towns but there is little or no such action yet to be seen in the cities.

BUFFALO — An increased volume of scrap is moving into the local area under allocations. Leading mills are able to make fair additions to badly depleted reserve stocks. Collections in the local area are expanding also. Quality of scrap, however, is only fair, with a number of rejections reported.



This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.

Self-Contained . . . .
Triple Compression . .
Automatically Controlled

LOGEMANN SCRAP PRESSES

handle high tonnages with minimum labor . . . *at low cost*

•

LOGEMANN METAL BALERS

. . . are built in a large range of sizes to meet specific conditions. Let Logemann's engineering service help you arrive at the most efficient and economical way of handling your scrap.

•

The compact unit illustrated is completely self-contained with oil tank and pump located directly over the press . . . utilizing the advantages of short pipe lines. Automatic controls, mounted in front of pump, give the operator full visibility at all times. Controls operate rams successively within a single rigid box. There is no complex construction which means there is *no need for specially-trained maintenance crews.*

Both two-ram and three-ram models are available with automatic controls or for manual manipulation.

Logemann Bros. Co. have specialized in the production of scrap metal presses for sheet mills, stamping plants, scrap yards, and metal manufacturing plants of all types for nearly 75 years. Write for full information — please state the nature of your scrap and tonnage.

LOGEMANN BROTHERS COMPANY
3164 W. Burleigh Street • Milwaukee 10, Wisconsin

Iron and Steel

SCRAP PRICES

(Maximum basing point prices, per gross ton, as set by OPS, effective Feb. 7, 1951. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →		$0.89	.75	.53	.68	.75	.51	.75	.75	.51	.75	.70	.76	.63	.65	.26	1.34	.75	.50	.20	.51	.51	.20	.52	.47	.51	.51	.51	.96	.50	.50	.43	.51	.33	.57	.66	.82	.88	.88	.88
Basing Points →		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minnequa	Houston	Los Angeles	Pittsburg, Cal.	Portland, Ore.	San Francisco	Seattle
GRADES	OPS No.																																							
No. 1 heavy melting	1	$44.00							$44.00					$43.00				$42.50						$42.00					$41.00	$41.15	$40.00	$39.50	$39.00		$38.00	$37.00	$35.00				
No. 2 heavy melting	2	42.00							42.00					41.00				40.50						40.00					39.00	39.15	38.00	37.50	37.00		36.00	35.00	33.00				
No. 1 busheling	3	44.00							44.00					43.00				42.50						42.00					41.00	41.15	40.00	39.50	39.00		38.00	37.00	35.00				
No. 1 bundles	4	44.00							44.00					43.00				42.50						42.00					41.00	41.15	40.00	39.50	39.00		38.00	37.00	35.00				
No. 2 bundles	5	41.00							41.00					40.00				39.50						39.00					38.00	38.15	37.00	36.50	36.00		35.00	34.00	32.00				
Machine shop turnings	6	34.00							34.00					33.00				32.50						32.00					31.00	31.15	30.00	29.50	29.00		28.00	27.00	25.00				
Mixed borings and turnings	7	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00		32.00	31.00	29.00				
Shovelling turnings	8	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00		32.00	31.00	29.00				
Cast iron borings	10	38.00							38.00					37.00				36.50						36.00					35.00	35.15	34.00	33.50	33.00		32.00	31.00	29.00				
No. 1 chemical borings	26	41.00							41.00					40.00				39.50						39.00					38.00	38.15	37.00	36.50	36.00		35.00	34.00	32.00				
Forge crops	11	51.50							51.50					50.50				50.00						49.50					48.50	48.65	47.50	47.00	48.50		45.50	44.50	42.50				
Bar crops and plate	12	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00		43.00	42.00	40.00				
Punchings and plate	14	46.50							46.50					45.50				45.00						44.50					43.50	43.65	42.50	42.00	41.50		40.50	39.50	37.50				
Electric furnace bundles	15	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00		40.00	39.00	37.00				
Cut struct., plate, 3 ft and less	16	47.00							47.00					46.00				45.50						45.00					44.00	44.15	43.00	42.50	42.00		41.00	40.00	38.00				
Cut struct., plate, 2 ft and less	17	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00		43.00	42.00	40.00				
Cut struct., plate, 1 ft and less	18	50.00							50.00					49.00				48.50						48.00					47.00	47.15	46.00	45.50	45.00		44.00	43.00	41.00				
Foundry steel, 2 ft and less	20	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00		40.00	39.00	37.00				
Foundry steel, 1 ft and less	21	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00		42.00	41.00	39.00				
Heavy trimminge	24	43.00							43.00					42.00				41.50						41.00					40.00	40.15	39.00	38.50	38.00		37.00	36.00	34.00				
No. 1 RR heavy melting	RR 1	46.00							46.00					45.00				44.50						44.00					43.00	43.15	42.00	41.50	41.00		40.00	39.00	37.00				
Scrap rails, random lengths	RR 14	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00		42.00	41.00	39.00				
Scrap rails, 3 ft and less	RR 16	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00				
Scrap rails, 2 ft and less	RR 17	52.00							52.00					51.00				50.50						50.00					49.00	49.15	48.00	47.50	47.00		46.00	45.00	43.00				
Scrap rails, 18 in. and less	RR 18	54.00							54.00					53.00				52.50						52.00					51.00	51.15	50.00	49.50	49.00		48.00	47.00	45.00				
Rerolling rails	RR 15	53.00							53.00					52.00				51.50						51.00					50.00	50.15	49.00	48.50	48.00		47.00	46.00	44.00				
Uncut tires	RR 20	48.00							48.00					47.00				46.50						46.00					45.00	45.15	44.00	43.50	43.00		42.00	41.00	39.00				
Cut tires	RR 21	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00				
Cut bolsters and side frames	RR 23	49.00							49.00					48.00				47.50						47.00					46.00	46.15	45.00	44.50	44.00		43.00	42.00	40.00				
RR specialties	RR 24, 28, 29	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00				
Solid steel axles	RR 25	58.00							58.00					57.00				56.50						56.00					55.00	55.15	54.00	53.50	53.00		52.00	51.00	49.00				
No. 3 steel wheels	RR 27	51.00							51.00					50.00				49.50						49.00					48.00	48.15	47.00	46.50	46.00		45.00	44.00	42.00				

Cast Scrap

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y. cast	11	52.00

Ceiling price of clean cast iron foundry runouts or prepared cupola drops is 75 pct of corresponding grade.

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh; Bessemer, Homestead, Duquesne, Munhall. Cincinnati; Newport. St. Louis; Granite City, East St. Louis, Madison, and Federal, Ill. San Francisco; South San Francisco, Niles, Oakland. Claymont; Chester. Chicago; Gary.

SHIPPING POINT PRICES (Except RR scrap)—For shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 heavy melting steel in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Ceiling need not fall below $32 per gross ton for No. 1 heavy melting steel, with set differentials for other grades. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (RR scrap) — Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point, non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 187-C.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

UNPREPARED SCRAP—Ceiling price is $8 a ton less than prepared base grades (No. 1 heavy & No. 1 RR heavy). Scrap suitable for compressing into No. 1 bundles is $6 less than No. 1 bundles; suitable for compressing into No. 2 bundles, $8 less than No. 2 bundles. For cast material requiring special preparation, price is breakable cast less preparation costs.

COMMISSIONS—Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—These alloy extras are permitted: Nickel; $1.25 may be added to price of No. 1 heavy for each 0.25 pct nickel between 1 and 5.25 pct. **Molybdenum**; $2 may be added to price of No. 1 heavy for molybdenum over 0.15 pct, $3 for content over 0.65 pct. **Manganese**; $4 may be added to price of No. 1 heavy or No. 1 RR heavy for content over 10 pct if scrap is in sizes over 8 x 12 x 24 in., $14 if less than 8 x 12 x 24 in. Manganese premium applicable only if sold for electric furnace use or on NPA allocation. **Silicon**: electric furnace and foundry grade adjustments are not applicable if silicon content is between 0.5 and 1.75 pct. **Chromium**; $1 may be added if scrap conforms to SAE 52100 analysis. **Multiple Alloys**; if scrap contains two premium alloy elements, total premium may not exceed ceiling premium for any one contained alloy.

RESTRICTONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. For example, the price established for Grade 28 (wrought iron) may be charged only when sold to a producer of wrought iron. Otherwise the ceiling price shall not exceed the ceiling price for the corresponding grade of basic openhearth. Restrictions on use are placed on the following grades: Chemical borings, wrought iron and rerolling rails, cupola cast, billet, bloom, and forge crops, Nos. 1 and 2 chemical borings. Ceiling prices on billet bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer. NPA prohibits openhearth users from buying electric furnace grades, Nos. 11 through 18, foundry grades, Nos. 20 and 21 and cast grades, 1, 7, 9 and 11.

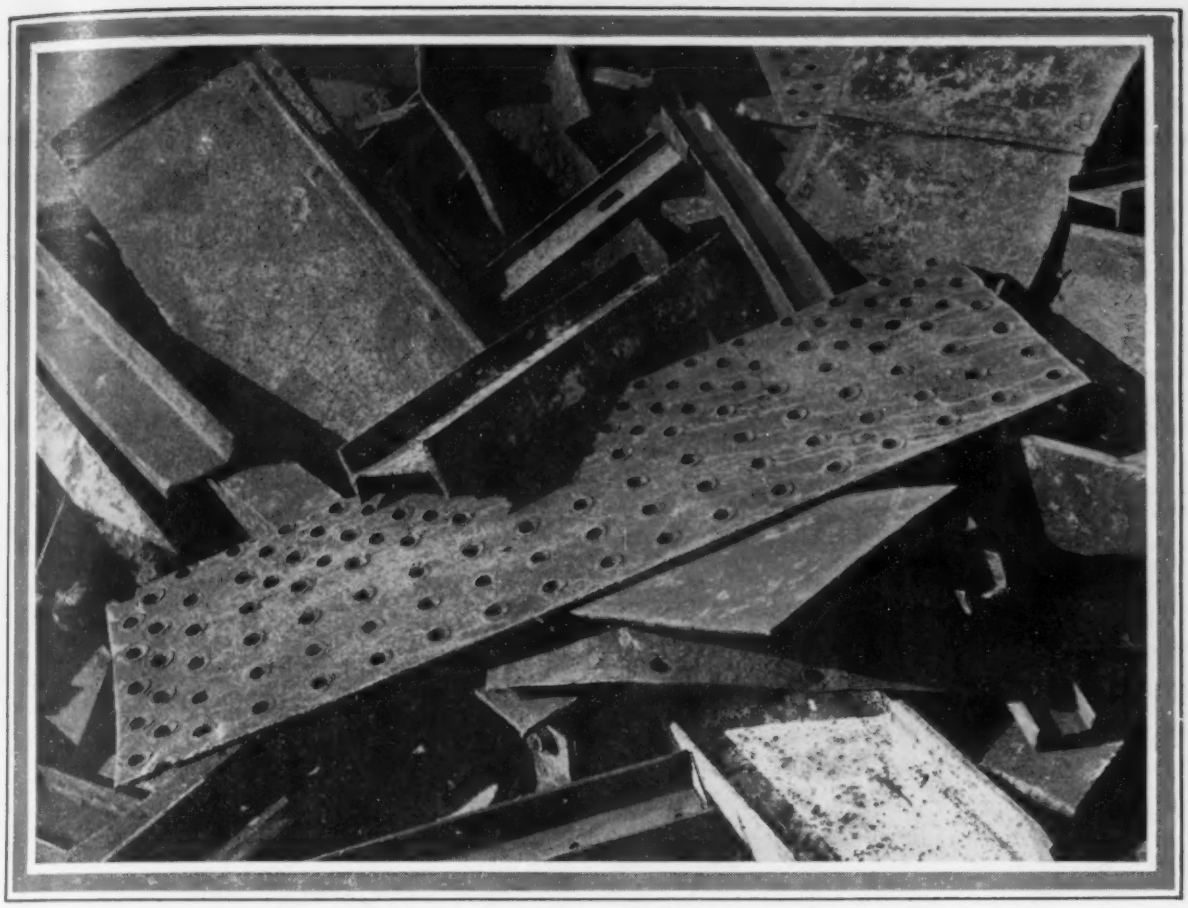
CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$ 8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	3.00
Bar crops and plate, cast steel, punchings and plate, cut structural and plate, 3 ft and under, foundry steel, 2 ft and under, wrought iron	10.00
Structural, plate scrap, 2 ft and less, foundry steel 1 ft and less	11.00
Structural and plate scrap, 1 ft and less	12.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00

Hamilton, Ontario

(Consumers buying prices, del'd gross ton)

Hvy. melting steel	$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed, steel scrap	31.00
Rails, remelting	35.00
Rails, rerolling	38.00
Bushelings	29.50
Bushelings, prepared new factory	33.00
Bushelings, unprepared new factory	28.00
Short steel turnings	28.00
Mixed borings, turnings	28.00
Cast scrap	58.00 to 60.00



#1 heavy melting steel

use:

About 80% of the world's steel is soft carbon steel produced by the Open Hearth furnace. #1 Heavy Melting Steel is the bellwether grade of scrap consumed in this furnace, topping all other scrap grades with a melt of approximately 21% of the total of purchased scrap melted. This heavy scrap (¼" or thicker) is most desirable because it gives more weight per charge.

source:

Originates from heavy industries, fabricating shops and structural steel demolition projects such as ship and bridge dismantling, etc.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

#1 Heavy Melting Steel. Clean wrought iron or steel scrap ¼ inch and over in thickness, not over 18 inches in width and not over 5 feet in length. Individual pieces must be free from attachments, and so cut as to lie flat in the charging box. May include heavy forgings, forge butts, billet, bloom, slab or bar crops not conforming to chemical analysis required for electric furnace or acid open hearth use. May include new mashed pipe ends, original diameter 4 inches and over. May not include auto body and fender stock.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

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READING, PENNA.
DETROIT (ECORSE), MICHIGAN
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2052 Railway Exchange Bldg.

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Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Flat-Rolled Steel: (cents per pound)	July 17, 1951	July 10, 1951	June 19, 1951	July 18, 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.75	36.75	36.50	33.00
Tin and Ternplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes.	$8.70	$8.70	$8.70	$7.50
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	6.60
Special coated mfg. ternes	7.50	7.50	7.50	6.35
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	4.145
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302)	31.50	31.50	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Pig Iron: (per gross ton)	July 17, 1951	July 10, 1951	June 19, 1951	July 18, 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	49.08
No. 2, Birmingham	48.88	48.88	48.88	42.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	186.25	186.25	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)	July 17, 1951	July 10, 1951	June 19, 1951	July 18, 1950
No. 1 steel, Pittsburgh	$44.00*	$44.00*	$44.00*	$41.75
No. 1 steel, Phila. area	42.50*	42.50*	42.50*	32.50
No. 1 steel, Chicago	42.50*	42.50*	42.50*	37.25
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	36.00
Low phos. Young'n	46.50*	46.50*	46.50*	42.75
No 1 cast, Pittsburgh	49.00†	49.00†	49.00†	43.75
No. 1 cast, Philadelphia	49.00†	49.00†	49.00†	38.50
No. 1, cast Chicago	49.00†	49.00†	49.00†	45.50

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)	July 17, 1951	July 10, 1951	June 19, 1951	July 18, 1950
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.25
Foundry coke, prompt	17.75	17.75	17.75	16.25

Nonferrous Metals: (cents per pound to large buyers)	July 17, 1951	July 10, 1951	June 19, 1951	July 18, 1950
Copper, electro, Conn.	24.50	24.50	24.50	22.50
Copper, Lake, Conn.	24.625	24.625	24.625	22.625
Tin, Straits, New York	$1.06†	$1.06	$1.06	91.00
Zinc, East St. Louis	17.50	17.50	17.50	15.00
Lead, St. Louis	16.80	16.80	16.80	11.80
Aluminum, virgin	19.00	19.00	19.00	17.50
Nickel, electrolytic	59.58	59.58	59.58	51.22
Magnesium, ingot	24.50	24.50	24.50	21.50
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50

†Tentative. *Revised.

Composite Prices

[Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)]

	Finished Steel Base Price	Pig Iron	Scrap Steel
July 17, 1951	4.131¢ per lb.	$52.69 per gross ton	$43.00 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton
One year ago	3.837¢ per lb.	46.38 per gross ton	37.17 per gross ton

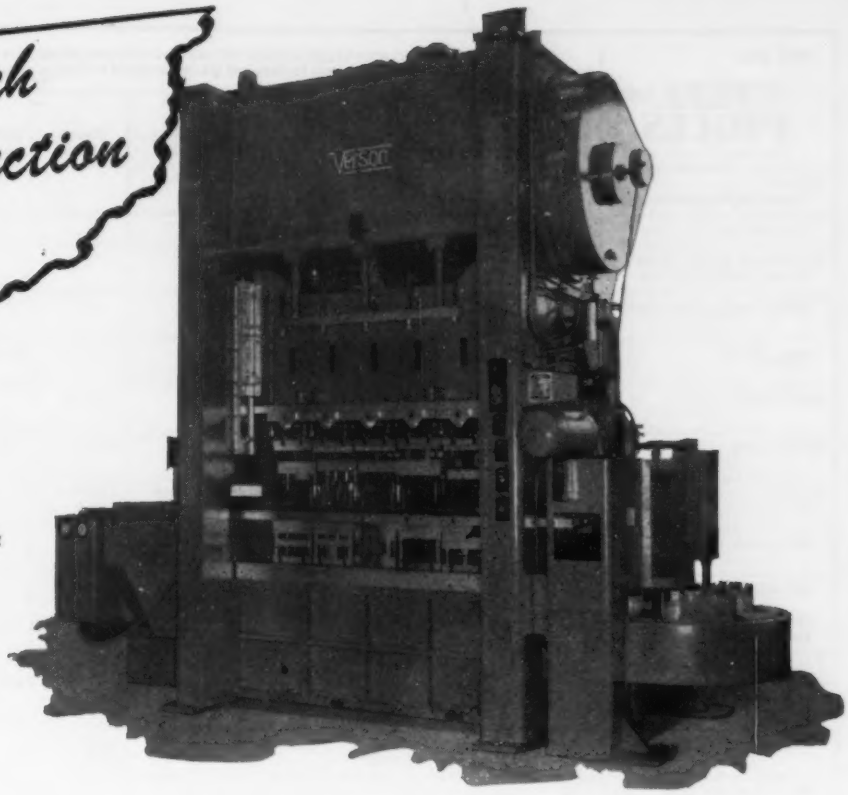
	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	$52.69 Jan. 2	$52.69 Jan. 2	$47.75 Jan. 30	$43.00 Feb. 7
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Can you match these production figures?



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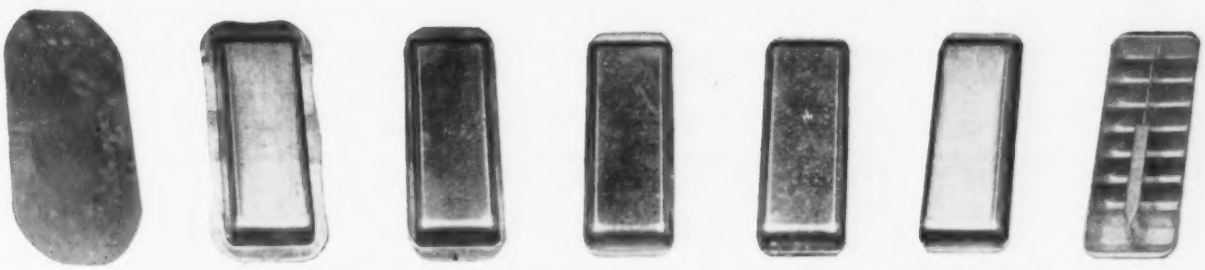

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IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$69.00[31]
Alloy, net ton	$70.00[1,17,6]	$70.00[1,4]	$70.00[1,6]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[31]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[3] 4.30[16]	4.10[3,4,33]	4.10[5]	4.10[3]			4.10[6]		4.10[35]		4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[38]	3.60[8,33]	3.60[1,5,8]	3.60[4,5]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[26]		3.60[3]	4.30[22]	3.80[13] 4.40[47]
Cold-rolled	4.35[1,5,9,15,7]		4.35[1,6,8]	4.35[4,5]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]	5.05[22]	4.55[13]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	5.50[44] 6.00[54]					4.80[3]	5.50[22]	
Enameling (12 gage)	4.65[1]		4.65[1,8]	4.65[4]		4.65[7]	4.65[6]						5.35[22]	
Long terne (10 gage)	5.20[9,15]		5.20[1]			5.20[7]	6.00[54]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,8] 5.90[8]	5.40[4,5]			5.40[1,4,13] 5.90[6]		5.40[3]	5.65[26]		5.40[3]		5.95[13]
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,8] 7.05[8]	6.55[4,5]			6.55[4] 7.05[6]		6.55[3]			6.55[3]		7.10[13]
Hi str. low alloy, galv.	7.20[1]											6.75[3]		
STRIP Hot-rolled	3.60[9], 4.00[41,58]; 3.75[28] 3.50[5,7]	3.50[56]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]	3.50[3]	3.50[3]		4.40[47] 3.80[13]
Cold-rolled	4.65[6,7,9] 5.00[28] 5.35[40,63,68]	4.90[8,66]	4.90[8]	4.65[2,5]		4.65[7]	4.65[4,6] 5.25[48,49] 5.35[13,40]		4.65[3]			4.65[3]		4.85[13] 5.45[47] 5.60[48,61]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[8]-5.80[6]				4.95[4]-5.50[1] 5.40[13], 5.80[6]		4.95[3]	5.55[26]		4.95[3]		5.95[13]
Hi str. low alloy, c.r.	7.20[9]			(6.55[3] 6.70[5]			(6.20[4], 6.55[13] 7.05[6]		6.40[3]			6.40[3]		
TINPLATE† Cokes, 1.25-lb base box (1.50 lb, add 25¢)	$8.45[1,5,9,15]		$8.45[1,6,8]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb base box, $7.15[1,4,5,8,9]; $7.25[3,11]; $7.35[22] 0.50 lb, add 25¢; 0.75 lb add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[16]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,33]	3.70[1,4,5,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[31]
Reinforcing	3.70[1,5]	3.70[4]	3.70[1,5,8]	3.70[4]			3.70[1,4,6]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,69,71]	4.55[2,33,70]	4.55[4,74,73]	4.55[3]	4.55[4,53]		4.55[6,57]		4.60[70]					4.70[64]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,33]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[8]	4.30[3,4]		4.30[3]			4.45[31] 4.65[13]
Alloy, cold-drawn	5.40[17,52,69,71,2]	5.40[4,33,69,70,73] 5.45[2]	5.40[4,73,74]		5.40[4,33]		5.40[6,35,57]	5.40[3]	5.40[3]					5.55[64]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,8] 6.05[8]	5.55[4,5]			5.55[1] 6.05[6]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15] 4.00[9]	3.70[1,33]	3.70[1,6,8]	3.70[4,5]			3.70[1,4,6] 3.95[13]		3.70[3]	4.15[26]	3.70[3]	3.70[3]	4.40[22]	
Floor plates	4.75[1]	4.75[1]	4.75[8]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,8] 6.15[8]	5.65[4,5]			(5.65[4] (5.70[13] (6.15[6]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,33]	3.65[1,8]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,8] 6.00[8]				6.00[6]	5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[16]	4.85[2] 4.33,34		4.85[3]			4.85[6]	Kokomo—4.95[30] 4.85[36]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[8]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$82.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$68.00[11]	F=$85.00[19] SF, LS, S=$85.00[62]	Geneva=$66.00[16]	Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[62]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[2], F=4.90[19] LA=4.90[24,62]	Worcester=4.40[2] Minnequa=4.35[14] Portsmouth=4.30[20]	WIRE RODS
		3.60[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[84], Geneva=3.70[16] Ashland=3.60[7]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4,11]	SF, LA=5.55[24]	Ashland=4.80[7] Kokomo=5.20[20]	Galvanized (10 gage)
				Ashland=4.65[7]	Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4,11]	SF, LA=4.25[24,62] F=4.75[19], S=4.50[62]	Atlanta=4.05[65] Minnequa=4.55[14] Ashland=3.50[7]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[3], 5.85[58] Trenton=6.00[45]	Cold-rolled
		5.30[11]	F=6.20[19] SF, LA=6.05[62] S=6.30[62]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		$8.55[11]	SF=9.20[24]		TINPLATE Cokes, 1.25-lb base box (1.50 lb, add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4,11]	SF, LA=4.40[24]	Atlanta=4.25[65] Minnequa=4.15[14]	BARS Carbon steel
4.30[83]	4.10[83]	3.70[4,11]	SF, S=4.45[62] F=4.40[19], LA=4.40[62]	Atlanta=4.25[65] Minnequa=4.50[14]	Reinforcing
			LA=6.00[4]	Newark=5.00[69] Putnam=5.10[69] Hartford=5.10[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[62] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester=5.75[2] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19] SF, S=6.30[62] LA=6.25[62]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4,11]	F=4.30[19] S=4.60[62]	Claymont=4.15[29] Coatesville=4.15[21] Minnequa=4.50[14] Geneva=3.70[16]	PLATE Carbon steel
				Harrisburg=5.25[38]	Floor plates
			F=5.70[19]	Coatesville=5.25[21] Claymont=4.85[29]	Alloy
		5.65[11]	F=6.25[19] S=6.55[62]	Geneva=5.65[16]	Hi str. low alloy
4.25[83]	4.05[83]	3.60[4] 3.65[11]	SF=4.20[62] F=4.25[16] LA=4.25[24,62] S=4.30[62]	Geneva 3.65[16] Minnequa 4.10[14]	SHAPES, Structural
		5.50[11]	SF=6.10[62,19] SF=6.00[62] LA=6.05[62]	Geneva=5.50[16]	Si str. low alloy
5.45[83]	5.25[83]	4.85[4,11]	SF, LA=5.80[24]	Atlanta=5.10[65] Worcester=5.15[2] Minnequa=5.10[14] Portsmouth=5.25[20]	MANUFACTURERS' WIRE Bright

†Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $2.20 from 1.25-lb coke base box.

Key to Steel Producers

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calstrip Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Claymont Steel Corp., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide Corp., McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furnace Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chem. Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable, Monessen, Pa.
104 Wallingford Steel Co., Wallingford, Conn.

STAINLESS STEELS

Base price cents per lb f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs billets rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs die blocks rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars wires structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 4, 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 4, 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7; Wallingford, Conn., 104.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103; Syracuse, N. Y., 17; Bridgeville, Pa., 59.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44; Syracuse, N. Y., 17.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 17; Syracuse, 17; Ferndale, Mich., 28; Washington, Pa., 39.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1; Syracuse, N. Y., 17.

*ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 Series.

WASHINGTON STEEL—Slightly lower on 300 Series except where noted.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Gal. Barbed Wire Base Col.	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Gal. (1) ¢/lb.
Alabama City-4	118	126	...	123	...	136	5.70	5.95
Aliquippa, Pa.-5	118	132	...	...	136	140	5.70	6.15
Atlanta-65	121	133	...	126	126	143	5.95	6.40
Bartonville-34	118	130	...	123	143	143	5.70	6.15
Buffalo-85	...	...	...	...	...	...	4.85	....
Cleveland-86	125	...	...	...	...	...	...	....
Cleveland-2	...	...	...	...	...	...	5.70	6.15
Crawfordsville-87	...	132	...	...	...	145	5.95	6.40
Donora, Pa.-2	118	130	...	123	140	140	5.70	6.15
Duluth-2	118	130	...	123	140	140	5.70	6.15
Fairfield, Ala.-11	118	130	...	123	...	148	5.70	6.15
Houston-83	126	138	...	...	...	148	6.10	6.55
Johnstown, Pa.-3	118	130	...	...	140	...	5.70	6.15
Joliet, Ill.-2	118	130	...	123	...	140	5.70	6.15
Kokomo, Ind.-30	120	132	...	125	138	142	5.80	6.05
Los Angeles-62	...	...	...	...	...	...	6.65	....
Kansas City-83	130	...	...	135	...	152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135	...	...	...	145	5.95	6.40
Moline, Ill.-4	...	...	136	...	...	...	...	....
Pittsburg, Cal.-24	137	...	...	147	156	160	6.65	6.80
Portsmouth-20	124	137	...	...	147	147	6.10	6.60
Rankin, Pa.-2	118	130	...	...	140	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123	...	136	5.70	5.95
S. San Fran.-14	...	...	...	147	...	160	6.65	7.10
Sparrows Pt.-3	120	...	...	125	142	142	5.80	6.25
Sterling, Ill.-33	118	130	...	123	140	140	5.70	6.15
Struthers, Ohio-8	...	...	...	...	...	...	5.70	6.15
Torrance, Cal.-24	138	...	...	...	...	...	6.65	....
Worcester-2	124	...	...	...	...	...	6.00	6.45
Williamsport, Pa.-51	...	...	150	...	...	...	...	....

Cut Nails, carloads, base, $7.35 per 100 lb (less 20¢ to jobbers), at Conshohocken, Pa., (26), Wheeling, W. Va., (15), $7.15.

(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N. Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	123.00 to 130.00

Class "A" and as pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer-1	3.60	4.00	4.70	...	...	...	...	...
Chicago-4	...	...	...	6.15	...	...	...	...
Ensley-11	3.60	4.00	...	...	...	...	...	...
Fairfield-11	...	4.00	4.40	...	...	6.60	4.50	...
Gary-1	3.60	4.00	...	...	...	...	4.50	...
Ind. Harbor-8	3.60	...	4.70	6.15	5.60	6.60	4.50	...
Johnstown-3	...	4.00	...	...	5.60	6.60	...	...
Joliet-1	...	4.00	4.70	...	...	...	...	...
Kansas City-83	...	...	...	6.40	...	...	...	9.85
Lackawanna-3	3.60	4.00	4.70	...	...	6.60	4.50	...
Lebanon-3	...	...	...	6.15	...	...	...	9.85
Minnequa-14	3.60	4.50	4.70	6.15	...	6.60	4.50	9.85
Pittsburgh-77	...	...	...	...	...	9.35	...	9.85
Pittsburgh-78	...	...	...	...	...	...	...	9.85
Pittsburgh-5	...	...	...	6.15	...	...	...	...
Pittsburgh-24	...	...	...	...	...	...	4.65	...
Seattle-62	...	...	...	6.65	...	...	4.65	...
Steelton-3	3.60	...	4.70	...	...	...	4.50	...
Struthers-6	...	...	...	6.15	...	...	...	...
Torrance-24	...	...	...	...	...	...	4.65	...
Youngstown-4	...	...	...	6.15	...	...	...	...

BOILER TUBES

$ Per 100 ft., cut, 10 to 24 ft.

F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.66
	2½	12	30.48	35.84	29.57	34.76
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.89	41.10	48.39
	4	10	52.66	61.89	51.03	60.02
National Tube	2	13	21.62	26.48	...	...
	2½	12	29.65	36.32	...	...
	3	12	34.90	41.64	...	...
	3½	11	40.34	49.41	...	...
	4	10	51.21	62.72	...	...
Pittsburgh Steel	2	13	...	27.08	...	...
	2½	12	30.48	37.15	...	...
	3	12	34.95	42.59	...	...
	3½	11	41.48	50.54	...	...
	4	10	52.65	64.16	...	...

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:

70% or more $43.00
60% or less 40.00

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD ½ In. Blk.	½ In. Gal.	¾ In. Blk.	¾ In. Gal.	1 In. Blk.	1 In. Gal.	1¼ In. Blk.	1¼ In. Gal.	1½ In. Blk.	1½ In. Gal.	2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	SEAMLESS 2 In. Blk.	2 In. Gal.	2½-3 In. Blk.	2½-3 In. Gal.	3½-4In. Blk.	3½-4In. Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	...	...	...	...	...	...
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0	...	...	...	...	...	...
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0	...	...	...	...	...	...
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	...	...	...	...	...	...
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	...	...	...	...	...	...
Pittsburgh-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	...	32.5	...	34.5	...
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	...	...	...	...	...	...
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	...	...	...	...	...	...
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	...	...	...	...	...	...
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	...	...	...	...	...	...
Oakland-19	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	...	...	...	...	...	...
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	...	...	...	...	...	...
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	...	...	...	...	...	...
Pittsburgh-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	...	33.0	...	36.5	...
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	...	...	...	...	...	...
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	...	...	...	...	...	...
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	26.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars				
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.86	.....	6.05	5.80	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.90	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd.	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[6]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.06–7.18	.....	6.33–6.38	.....	6.43–8.02	6.33–6.48	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.59	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[2]	8.70–8.75	.....	8.05	6.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	9.95[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.26	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	51.75	52.25	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, Ohio-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, Ohio-97, 98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Monessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-26	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct, except low phos. 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick *(F.o.b. works) Carloads, Per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.00

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.69
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports) *Per gross ton*

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

F.o.b. Mill Cents Per Lb.	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn.-58	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa.-41	.....	6.80	7.40	9.35	11.65
Cleveland-2	4.65	6.45	7.40	9.35	11.65
Detroit-68	5.60	6.65	7.25	.....	.....
New Castle, Pa.-40	5.35	6.80	7.40	9.35	.....
New Haven, Conn.-68	5.85	6.75	7.35	.....	.....
Sharon, Pa.-13	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va.-9	5.35	6.80	7.40	9.35	11.65
Worcester, Mass.-2	4.95	6.75	7.70	9.65	11.65
Youngstown-48	.....	6.80	7.40	9.35	11.65

THIS IS THE TIME TO SAVE PICKLING ACID!

Here are some ways to pickle more steel with less acid:

1. IMPROVE THE EFFICIENCY OF YOUR PRACTICE

Use every available pound of acid before dumping, by:

a. Operating baths until more than the usual amount of iron accumulates,

b. Stopping the additions of acid sooner than usual,

c. Offsetting the slower pickling by raising bath temperature to boiling,

d. Lengthening pickling time for last one or two batches.

Do not, if possible, dump bath with as much acid content as previously. Dump only when bath fails to work after above recommendations have been followed.

2. IMPROVE THE CHEMICAL EFFICIENCY OF YOUR PICKLING

Utilize every available pound of acid before dumping, by:

a. Increasing the proportion of "RODINE"® in the bath up to 1% by volume of the acid.

The increased amount of "RODINE" will:

a. Save the acid now needlessly wasted dissolving good metal,

b. Retard from build-up, thus saving acid by reducing number of times tanks must be dumped.

Write for further information on saving pickling acids.

STANDARD PICKLING PRACTICE THE WORLD AROUND — CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY

AMBLER, PA.

11

Got the habit of reading page 11?
Newsfront is there EVERY week.
Designed to save you time and keep
you up to date on what's new in the industry.
IT PAYS TO READ IRON AGE ADS TOO!

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	38½
9/16 in. & ⅝ in. x 6 in. & shorter	13½	36½
¾ in. & larger x 6 in. & shorter	17½	39½
All diam. longer than 6 in.	14	37½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg (Reg.)	K.	Less Keg (Hvy.)	K.
½ in. & smaller.	15	28½	15	28½
9/16. in. & ⅝ in..	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger.	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger.	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller.	26	37	22	34
9/16 in. & ⅝ in..	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	13	25
1⅝ in. & larger.	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller.	35	45	28½	39½
9/16 in. & ⅝ in..	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger.	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts — *Pct Off List*

Packaged, steel, plain finished	48—10
Packaged, plated finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb
½ in. & larger	$7.35
	Pct Off List
7/16 in. & smaller	30

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	49
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	40
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	38
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	24
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.00
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.00
Less ton lots	31.50

ELECTRODES

Cents per lb., f.o.b. plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)..	*29.5	
Washgtn, Pa. (39)....	*29.5	
Claymont, Del. (29)...	*28.00	
Conshohocken, Pa. (26)		*27.50
New Castle, Ind. (55)..	*26.50	*25.50
Nickel-carbon		
10 pct Coatesville (21)..	32.5	
Inconel-carbon		
10 pct Coatesville (21)..	40.5	
Monel-carbon		
10 pct Coatesville (21)..	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7).....		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.235
18	4	1	—	5	$1.36
18	4	2	—	—	$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	87¢

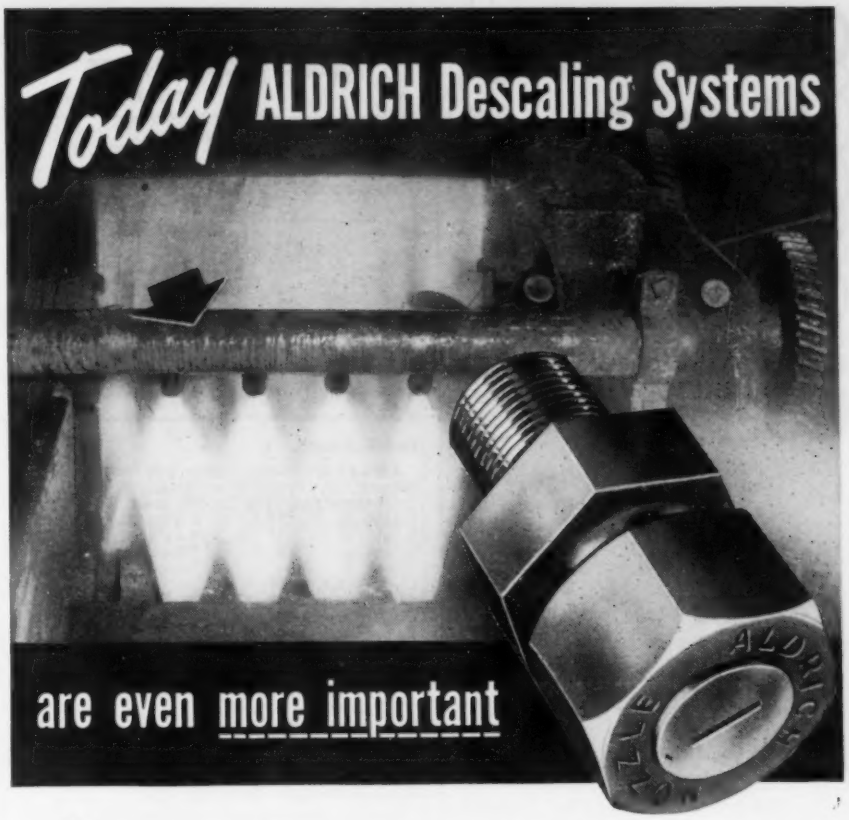
High-carbon chromium ..... 63.5¢
Oil hardened manganese..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

METAL POWDERS

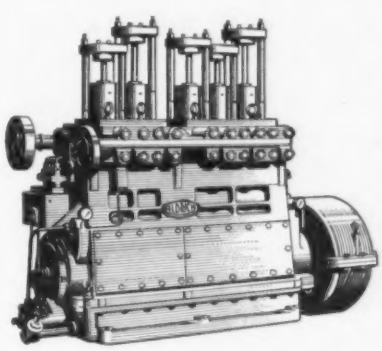
Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags...	7.4¢ to 9.0¢
Canadian sponge iron, del'd In East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	53.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25c
Copper, electrolytic	10.75¢ plus metal value
Copper, reduced	...10.00¢ plus metal value
Cadmium, 100-199 lb	..95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd	$3.50
Lead	.....7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder	..7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	83.00¢
Stainless steel, 316	$1.10
Tin	.....14.00¢ plus metal value
Tungsten, 99% (65 mesh)..	$6.00
Zinc, 10 ton lots	23.0¢ to 30.5c



Because the metal industries *need* peak production. And when it comes to descaling—an *Aldrich* system is the quickest means of getting the finish required.

Aldrich Spray Nozzles employ a Venturi tube, embodied in the body and disc, to direct flow through a *rectangular* orifice. This produces a knife-edged *line* of water with an impinging force equal to 95% of the potential energy supplied to the orifice. The sharp jet and the striking force developed by Aldrich nozzles give far more effective descaling than jets of equal force but with a larger impinging area, produced by more water at lower pressure . . . Aldrich Spray Nozzles are available from stock. *Write for Data Sheet 61-2.*



The Aldrich Pump for your system may be a Direct Flow Triplex or other Multiplex unit . . . fitted with Aldrich Patented Synchronized Suction Valve Control, or Automatic By-Pass Valve to operate with all types of accumulators. For your *complete* Descaling System, or for pumps for roll balancing or press operation: call on Aldrich! Write today for Data Sheets on equipment.

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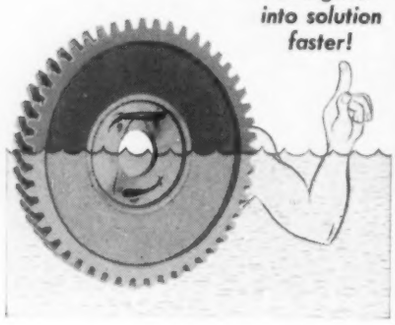
TOUGH Cleaning Jobs Call for... HOUGHTON

HOUGHTO-CLEAN 220

Emulsion Type Cleaner*

Dirt goes into solution faster!



Houghton Houghto-Clean 220

- forms a stable, non-foaming emulsion with hot or cold water!
- removes processing oils, dirt and coatings from metals without harming the surface!
- is non-toxic and won't cause excessive drying of your skin!
- is equally effective in spray, dip and power washing of ferrous or non-ferrous metals!

*This emulsion type cleaner can be used in many places to replace scarce alkaline cleaners. Moreover, many users are finding Houghto-Clean 220 a superior replacement for either straight petroleum solvents or non-flammable solvents.

WRITE FOR DATA SHEET on Houghto-Clean 220 to E. F. Houghton & Co. Philadelphia 33, Pa.

HOUGHTO-CLEAN 220 ... a product of

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service ...

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech-Bottom-15	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28	....	7.25	8.50	9.30	9.85	....	....
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granity City-22	....	7.95	9.20	....	....	....	....
Ind. Harbor-3	6.75	7.25	....	....	....	....	....
Mansfield-75	7.25	7.75	9.00	9.80	....	....	....
Niles, O.-64	7.05	7.55	....	....	....	....	....
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si.			22.60

Foundry Ferrochrome

Contract prices, cents per lb of alloy. Noncontract prices add 2.50¢ per lb.

High carbon 8 Mesh and down.

62 to 66% Cr, 5 to 7% C, 7 to 10% Si.

Carloads, bulk	23.25
Carloads, packed	24.15
Ton lots, packed	27.25

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.10% max. C.	$1.14
0.50% max. C.	1.10
9 to 11% C.	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

For...

CLEANER CASTINGS

FEWER REJECTS

FASTER PRODUCTION

AlSiMag® Ceramic STRAINER CORES

Foundries using AlSiMag Strainer Cores report substantial reductions in rejects and a major improvement in the smoothness and uniformity of castings.

AlSiMag Ceramic Strainer Cores are flat, hard, kiln-fired ceramic cores that fit snugly into the gate of the mold. They strain the incoming metal and regulate its flow in the best way yet developed.

These cores have excellent qualities for fast handling and easy storing. They are tough, gas free and require no change in molding procedure. They withstand all normal foundry pouring temperatures. They do not disintegrate. They are available in many shapes and sizes, or specially made to your own specifications.

Free Samples On Request

Test these cores in your own foundry. Samples of sizes in stock sent free on request. Samples made to your specifications; reasonable cost.

AMERICAN LAVA CORPORATION

50 YEARS OF CERAMIC LEADERSHIP

CHATTANOOGA 5, TENNESSEE

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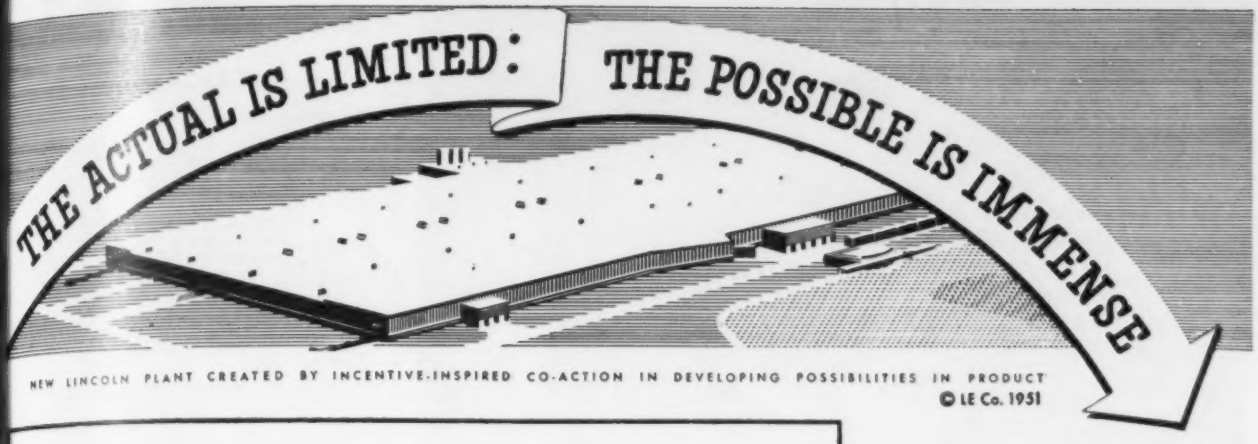

NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

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HOW ECONOMIES OF WELDED STEEL CUT YOUR PRODUCTION COSTS

WHEN designs utilize the economies of welded steel construction, invariably costs are less. That's because fewer pounds of less costly material are needed . . . Each pound of metal can be more easily concentrated where it does the most good.

Wherever costs are higher, inevitably the designs have fallen short of embodying the potential savings, or the products themselves have been overdesigned. A careful reappraisal by the shop before a design is "frozen" simplifies construction details and eliminates every unnecessary expense for lowest cost of manufacture.

Your Lincoln Welding Engineer will gladly help you analyze your designs and point out various cost reduction possibilities. Simply call or write.

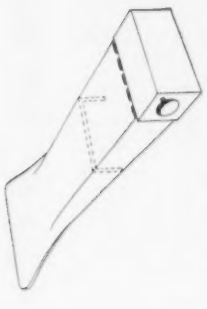

Fig. 3. Saves 51% Cost *by forming lever arm and pad as integral piece from 10 gauge metal. Weighs 2.5 pounds. . . costs 54¢.*

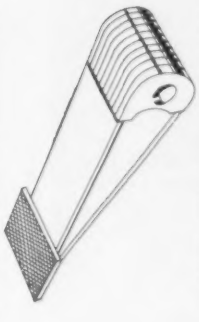

Fig. 4. Saves 67%. Eliminates Broaching. *Hub with integral key is produced by stacking stampings in assembly. Arm is 10 gauge, brake formed and welded to hub. Cost is only 31¢ . . . weight 2.2 pounds.*

the ACTUAL

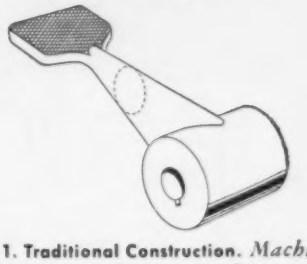

Fig. 1. Traditional Construction. *Machine foot-lever, 10 inches long, weighs 6 pounds. Cost with broached keyway is $1.15.*

increasing the YIELD

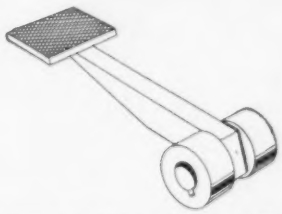

Fig. 2. Simple Steel Design Costs 34% Less. *Can be built by the shop with only saw and shears. Weighs 2.7 pounds . . . costs 68¢ complete with keyway.*

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Unlimited opportunities to create efficient, lower cost designs.

SEE HOW STEEL BUILDS IT WITH LESS MATERIAL

Machine Design Sheets are available to designers and engineers. Simply write on your letterhead to Dept. 58,

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CLEVELAND 1, OHIO

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MAGCOA Magnesium
DOCKBOARDS
and cut materials handling costs!

- ¼ THE WEIGHT OF STEEL of comparable size and strength
- Easy, safe, fast to handle
- Designed like a bridge for structural dependability
- Quarter round safety curbs
- Exclusive, built-in hand holds

Magcoa Dockboards made of magnesium, can be handled by one man without the aid of truck, chain or hoist. They're easier to approach and drive onto . . . rounded and tapered ends of safety curbs offer maximum turning radius. Magcoa Dockboards are built like a bridge with reinforcing floor members and all-welded construction.

They offer maximum safety and strength with minimum weight . . . in any size and any capacity to suit your special needs.

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to HANDLE the BIG MAJORITY of
YOUR CRANE REQUIREMENTS!

STANDARD MODELS MEET OVER 90% OF YOUR REQUIREMENTS

Service-proved, reliable performance with long periods of trouble-free operation has prompted many large manufacturers to standardize on Euclid Cranes.

A large percentage of orders are REPEAT ORDERS for cranes, ½ to 100 tons capacity and in spans up to 100 ft.

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THE EUCLID CRANE & HOIST CO.
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FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$188

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.95
Ton lots	12.55

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	75.00	76.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	34.75
Ton lots	36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn 19.15c

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	16.55
90-95% Si			17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd, Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si	21.25	23.10	24.30

For other ferroalloys see May 24 issue, p. 160.

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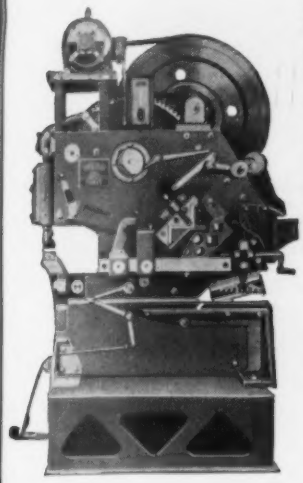
STEELWORKER

Combination Shear, Punch, and Coper

5 Complete Tools in a Single Unit



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4 Shears plates and bars.

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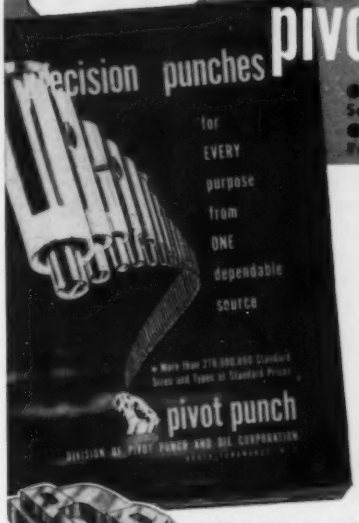

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A quick glance over the list of our long-time customers shows that many of the larger ones started small. That's why we make it a continuing policy *to give the same close attention to every order, regardless of size.*

You'll never have a gear problem too small to interest us. For, in our forty-five years of manufacturing and selling gears of all types, it has become increasingly evident that good *service to all and our future business success*—go hand in hand.

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GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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MORE FLEXIBILITY IN YOUR SHOP

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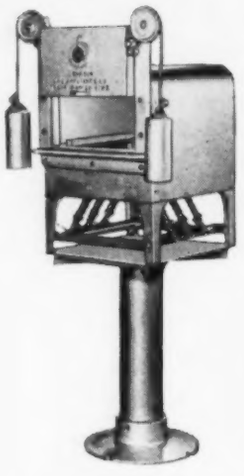
Another in the Johnson line of dependable gas equipment has won its place in both large and small shops and plants. Operators like its easy adaptability. Six Johnson Direct Jet Bunsen Burners with individual shut off valves and pilot lights provide steady, easily controlled heat from 300 to 1850° F. Semi-muffled type with burners operating below Carbofrax hearth. Firebox: 7"x 13"x 16½". Also available bench style. Write for complete and factual information.

A smaller version of this highly flexible furnace is the No. 654. Four burners deliver 300 to 1800° F. Firebox: 5" x 7¾" x 13½". Available as pedestal or bench style.

JOHNSON GAS APPLIANCE CO.
598 E Avenue, N. W., • Cedar Rapids, Iowa

Johnson No. 706 Pedestal Style	$278.00
Bench Style	$250.00
Johnson No. 654 Pedestal Style	$150.00
Bench Style	$124.00

F.O.B. Factory

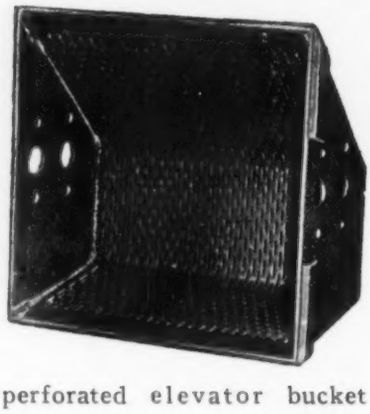


Model No. 706

JOHNSON
INDUSTRIAL GAS EQUIPMENT

Furnaces • Burners • Torches • Valves • Mixers • Blowers

Typical of Hendrick's Manufacturing Facilities



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1876—Seventy-Fifth Anniversary—1951

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Other Ferroalloys

Alsifer, 20%, Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 9.50¢
Ton lots ..... 11.50¢

Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.15

Ferrocolumbium, 50-60%, 2 in. x D, contract basis, delivered, per pound contained Cb.
Ton lots $4.50
Less ton lots 4.95

Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa. freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.65

Ferrotantalum, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $5.00

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.
Openhearth ..... $3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) 3.20- 3.30

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium pentoxide, 86 to 89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.33

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Carbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots $1.30
F.o.b. Wash., Pa.; 100 lb up 55
10 to 14% B 1.30
14 to 19% B 1.50
19% min. B 1.75

Grainal, f.o.b Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 65¢
No. 79 ..... 50¢

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots $1.45
Less ton lots 1.57

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered. $1.80
Less ton lots 1.85

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

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President and General Manager
Eastern Air Lines, Inc.

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A vigorous exponent of thrift, Captain Eddie Rickenbacker made the Payroll Savings Plan available to his employees of Eastern Air Lines some years ago. From time to time, in personally dictated letters addressed "To All Members of Eastern Air Lines Family", he points out the individual and national advantages of the Payroll Savings Plan, and urges members of Eastern Air Lines Family "... to sign up on the Automatic Payroll Savings Plan. In years to come I am sure you will be mighty glad you did."

How about *your* Payroll Savings Plan? What have you done since Savings Bonds became Defense Bonds? What is your percentage of employee participation?

From coast to coast, companies large and small are installing the Payroll Savings Plan or revitalizing their present plans through person-to-person canvasses which put a Payroll Savings Application Blank in the hands of every employee.

Note the results of some recent person-to-person canvasses. Think what management efforts like this mean to the Defense effort. Then phone, wire or write to Savings Bond Division, U. S. Treasury Department, Suite 700 Washington Building, Washington, D. C. Your State Director will be glad to help you put in a Payroll Plan or show you how to conduct a person-to-person canvass.

Results of recent person-to-person canvasses to increase participation in Payroll Savings

39 companies . . . total employees	487,347*
Employees on plan before canvass	81,481
Employees on plan after canvass	329,942
% of participation before canvass	16.8%
% of participation after canvass	67.7%
New savers added to plan	**248,461**

Based on National averages, employees in this group of companies are saving more than $7,000,000 every month in United States Defense Bonds.

**Includes 62,070 employees of six companies which did not have plan before canvass.*

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10 ton Milwaukee 89'5" Span 220/3/60 With two 5 ton Trolleys

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50 ton P & H Trolley with 15 & 37 H.P. Motors 220 volt 3 phase 60 cycle

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Gisholt Model 2L Turret Lathe, Motor Driven 15" Dia. 3 Jaw Universal Chuck, 4" Hole in Spindle. NEW 1942 or Later

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1500 ton Mesta Steam Hydraulic Forging Press Quick Acting. 48" Stroke, 8' x 3'6" Between Columns—Including Wellman Manipulator. Rotating Type

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23" x 60" Mackintosh Hemphill Three High Breakdown Mill, Cast Steel Housings, Motor Driven Screw Downs, Complete with Pinion Stand, etc.

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120,000 lb. SOUTHWARK-TATE-EMERY Universal Hydraulic Testing Machine. LATE

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700 KVA Federal Flash Welder, Enclosed Rim Type, 440 Volt, Single Phase, Ring Sizes 6" to 35" Diameter x 12" Wide

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The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

A Steady Drop—Aside from the ever present demand for good late-type production equipment which is for the most part unobtainable, the used machinery business in the Chicago area has fallen off steadily from the beginning of June. The decline cannot be wholly attributed to a seasonal summer slump, according to trade sources. Inquiries have become fewer and fewer and some firms report June business was two-thirds below that of May.

Reasons for Decline—The main reasons for the decline in activity seem to be the prospects of peace in Korea with the resulting unsettled outlook for business and the lack of sufficient government orders to take up the slack created by a tapering off of civilian production. Some quarters are of the opinion that any pickup in activity will be due solely to the letting of government contracts and they don't look forward to any increased business from non-defense manufacturers.

Inquiries Numerous — Inquiries for heavy equipment are still numerous. However, the small machinery buyers who represent the bulk of the business are not as numerous as they were a month or so ago. This is probably due to the fact that large manufacturers already have received prime contracts while the smaller subs as yet have not come into the defense picture and are undergoing materials shortages or lack of demand for their consumer production.

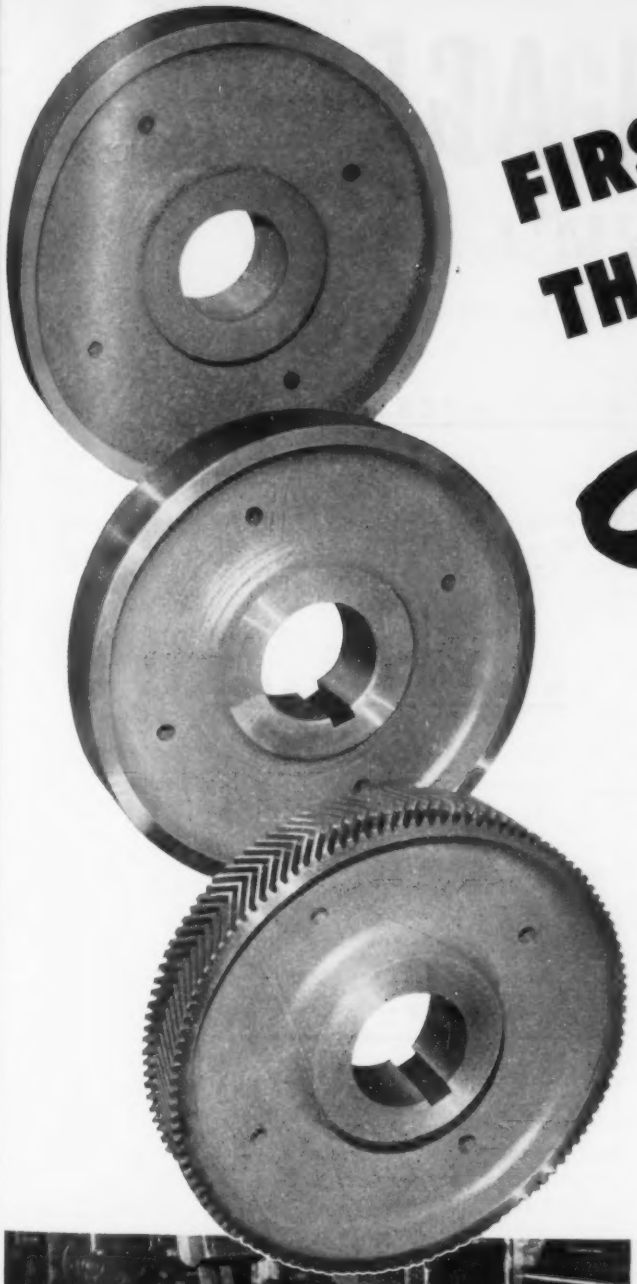
Replacements Needed—Rebuilders are still enjoying a high level of activity due to government programs. Their main difficulty at present is the procurement of necessary parts needed for rebuilding. Some rebuilders report lack of these parts are holding up progress of the work.

Willing To Buy—Although the tempo of activity has receded, prices for good late-type equipment remain at previous high levels. Customers are still willing to pay top dollar if they can get what they want. They are still not willing to settle for machines of older vintage. Some think there is little holding off because of the imminence of price controls. If a user sees what he wants he is going to snap it up rather than wait for price controls when the equipment is no longer available. Users are still offering unheard of prices at auction sales and thus preventing some dealers from entering into the bidding.

Cleveland Market—The most noticeable change in the Cleveland market picture, apart from a sharply reduced volume, is the absence of the small shops among the buyers. The average dealer now has fewer customers than he had 6 months ago, but they are the bigger companies. Buyers, according to dealers in this area, are holding off until ceilings are placed on tools and then the market will show a sharp upturn.

The big problems in rebuilding are replacement parts, electrical equipment, and skilled manpower which is practically unavailable. Available stocks of rebuilt machines are probably at an all time low.

Buying Decline — Good, used late-type machine tools are still a rare item and prices on such equipment have held up rather well. Buyers are shopping and dealers are meeting price resistance. But late-type equipment continues to move in reduced volume. Older type machines are not moving to any appreciable extent and price weakness on this type of equipment is considerable, as many dealers are loaded with it. Some specialties, such as tube bending machines, are showing signs of life, but strictly in the aircraft field.



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Strength is something you never have to worry about when using Bethlehem blanks. They're sound, strong, solid steel all the way through—steel that's been forged and rolled to impart uniform density and just the right grain structure. Actually, because of their high strength, you can often use thinner sections, thus effecting a saving of weight.

But there are other good points to keep in mind, too. For instance, you're almost bound to agree with the long-time user of Bethlehem blanks who recently wrote: "One of the most important advantages is their ease of machining. . . . The solid, clean metal in the forged blanks is particularly appreciated in gear-tooth-cutting operations."

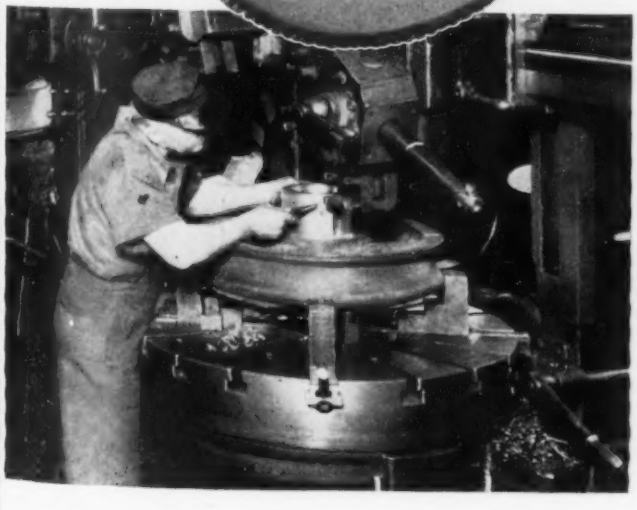
These blanks are especially fine for heavy-duty applications like gears, crane and sheave wheels, turbine rotors, flywheels, tire molds, brake wheels, etc. They come in sizes from approximately 10 to 42 in. OD, with heat-treating optional.

For further details, ask for illustrated Booklet No. 216. It shows various steps of manufacture, pictures of blanks before, during and after machining, and many applications of the products.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation



BETHLEHEM ROLLED-AND-FORGED CIRCULAR PRODUCTS